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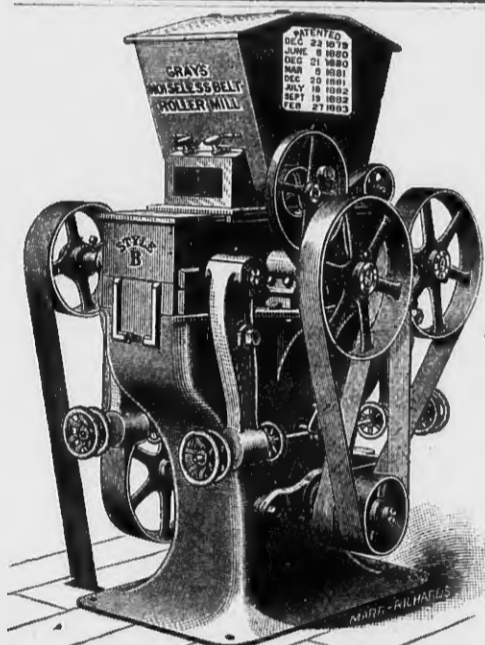
MILWAUKEE, NOVEMBER, 1884.

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ONE OF THE KIND OF MILLS WE BUILD.

THE JOHN T. NOYE MFG. CO., BUFFALO, N. Y.
Laury's, Pa., September 1, 1884.

GENTLEMEN:---Since putting in the rolls made by you, and changing the bolting arrangements as advised, I have been running night and day, turning out over two hundred barrels of flour per twenty-four hours, with a yield surprisingly under $4\frac{30}{60}$. I doubt if our flour can be beaten in this country. This statement is pretty strong, but can be backed up. I can clean the middlings so that there is not a particle of flour left. Millers coming here to see our offal, do not believe but I have some secret way of manipulating the material. It is all square milling on superior rolls and with a superior system. I could not fill my orders if I had double the capacity.

Yours truly,
J. R. SCHALL.


GRAY'S NOISELESS BELT ROLLER MILLS.

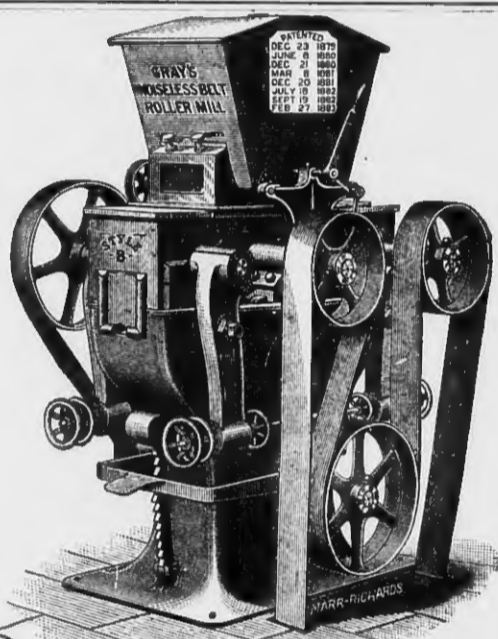
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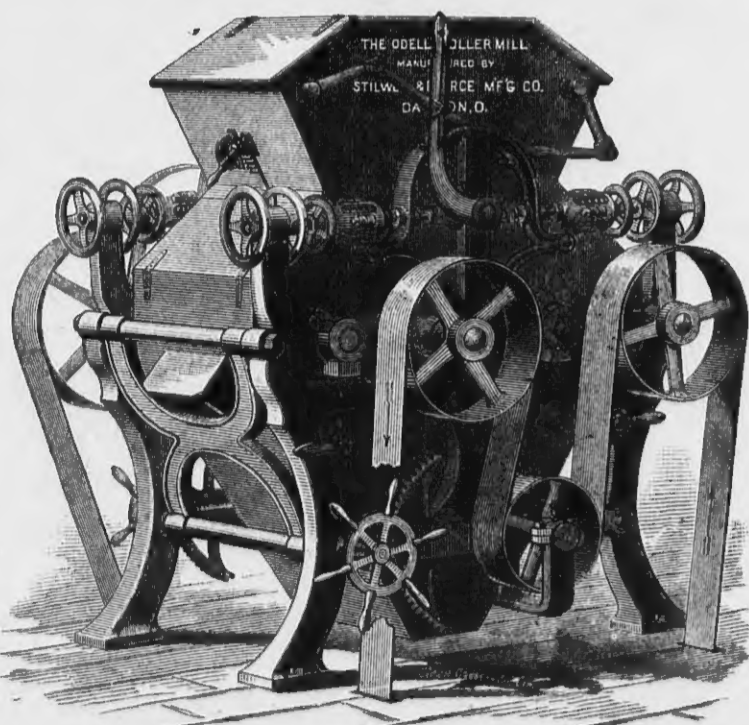
E. P. ALLIS & CO.,

Sole Manufacturers.

Reliance Works, Milwaukee, Wis.


ODELL'S ROLLER MILL SYSTEM.

Is now in successful operation in a large number of mills, both large and small, on hard and soft wheat, and is meeting with Unparalleled Success. All the mills now running on this system are doing very fine and close work, and we are in receipt of the most flattering letters from millers. References and letters of introduction to parties using the Odell Rolls and System, will be furnished on application to all who desire to investigate.



ODELL'S ROLLER MILL,

Invented and Patented by **U. H. ODELL**, the builder of several of the largest and best Gradual Reduction Flour Mills in the country.

AN ESTABLISHED SUCCESS

WE INVITE PARTICULAR ATTENTION TO THE FOLLOWING

→*POINTS OF SUPERIORITY*←

possessed by the Odell Roller Mill over all competitors, all of which are broadly covered by patents, and cannot be used on any other machine.

1. It is driven entirely with belts, which are so arranged as to be equivalent to giving each of the four rolls a separate driving-belt from the power shaft, thus obtaining a *positive differential motion* which cannot be had with short belts.

2. It is the only Roller Mill in market which *can instantly be stopped without throwing off the driving-belt*, or that has adequate tightener devices for taking up the stretch of the driving-belts.

3. It is the only Roller Mill in which *one movement of a hand-lever spreads the rolls apart and shuts off the feed at the same time*. The reverse movement of this lever brings the rolls back again exactly into working position and *at the same time turns on the feed*.

4. It is the only Roller Mill in which the movable roll-bearings may be adjusted to and from the stationary roll-bearings *without disturbing the tension-spring*.

5. Our Corrugation is a decided advance over all others. It produces a more even granulation, *more middlings of uniform shape and size, and cleans the bran better.*

We use none but the BEST ANSONIA ROLLS.

OUR CORRUGATION DIFFERS FROM ALL OTHERS, AND PRODUCES

LESS BREAK FLOUR and MIDDINGS of BETTER QUALITY.

Mill owners adopting our Roller Mills will have the benefit of Mr. Odell's advice, and long experience in arranging mills. Can furnish machines on Short Notice. For further information, apply in person or by letter to the sole manufacturers.

STILWELL & BIERCE MANUFACTURING CO.,
Agents for Du Four's Bolting Cloth.

[Please mention this paper when you write to us.]

DAYTON, OHIO, U.S. A.

To SETTLE A DISPUTED QUESTION!

Owing to the fact that we are the only manufacturers of Roller Mills in this country who are authorized to build and sell machines containing Porcelain Rolls under the Wegmann patents, our business competitors have from motives of policy, been forced to oppose the introduction and use of the justly

CELEBRATED

Wegmann Porcelain Roller

MILLS!

of which we are the exclusive licensees and sole manufacturers in America. As many millers have not yet given the Porcelain Rolls a practical trial, but have formed their opinions of their merits wholly from hearsay evidence, we desire to give millers generally an ample opportunity to determine for themselves, from a thorough trial in their own mills, the merits or demerits of Porcelain Rolls, and, therefore, make the following

OFFER!

We will sell any miller who is now grinding purified middlings on millstones, smooth iron rolls or scratched rolls, one of our

Gray's Noiseless Belt Drive Porcelain Roller Mills,

of suitable capacity, at our regular prices, and if the result of an impartial and careful trial does not establish the fact that the Porcelain Rolls are superior to either millstones, smooth iron or scratch rolls, for the purpose for which we recommend them, we will replace the Porcelain Rolls with either smooth or scratched iron rolls, allowing the difference in price; or the entire machine may be returned to us at our expense. Where millers desire, we will send a competent miller to instruct them in the proper handling of the Porcelain Rolls without expense to them. Our offer is made with the purpose of placing it in the power of every miller to satisfy himself that he is using the best machine for flouring purified middlings. Millers desiring to avail themselves of this offer should send sample of stock they wish to reduce, stating capacity required, to

EDW. P. ALLIS & CO.,

Reliance Works, Milwaukee, Wis.

[Please mention the UNITED STATES MILLER when you write to us.]

The United States MILLER

Published by
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MILWAUKEE, NOVEMBER, 1884.

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[For the UNITED STATES MILLER.]

THE WHEAT QUESTION.

In our last issue we referred briefly to the experiments of M. Gatellier, in France, relative to the production of a superior wheat for milling purposes. The results of M. Gatellier's experiments, undertaken primarily for the purpose of putting the French millers in as favorable position as possible for competition with foreign industry, form the subject of a communication to the *Journal de la Meunerie*, from which we extract the following interesting particulars.

"It is not only necessary to take every precaution, at the time of harvesting, for bringing in the grain as dry as that of foreign countries, but in addition to dryness it is required that our wheat should be equally rich in gluten, that is in azotic substance.

For this purpose a question is raised between agriculture and milling analogous to that existing between agriculture and beet sugar manufacture, as regards the richness in sugar in different beets.

By a succession of experiments in cultivation and chemical analyses carried on during the year with the assistance of M. L'Hôte, analytical chemist at the Institute of Agriculture, we have come to the conclusion that it is entirely feasible, with certain precautions, to raise in France wheat just as rich in gluten, as that raised in a virgin soil, where the azote, accumulated during centuries, furnishes the necessary gluten.

This may be accomplished by attending properly to 1, the question of seeding, 2, the question of cultivation.

As to seeding, it is necessary to sow such varieties of wheat that abound in gluten. Unfortunately, however, we have done the very opposite, in this respect, to what we should have done, abandoning our own native wheat with long kernels, and adopting in its stead the English varieties with round kernels. Generally speaking a long grain contains more gluten than a round one, and for this reason; if the transverse section of a kernel of wheat is examined under the microscope, it will be noticed that, in the farinaceous mass the richness is greater in the part contiguous to the covering than in the center. The consequence of this fact is, that the more the kernel approaches to the spherical form, the smaller its cortical farinaceous part is, compared with its whole volume, and the less gluten it contains. The more elongated it is, on the contrary, the more gluten it will contain in its farinaceous mass.

On the other hand the elongation of the wheat kernel must not be exaggerated, so as to approach, for instance, the shape of a kernel of rye; since, for the same reason, the more elongated the kernel, the greater the percentage of shell, as compared with the total volume, and, consequently, the greater will be the yield of bran, and the smaller the quantity of flour obtained. By thus encouraging the cultivation of the round English varieties of wheat, by reason of their greater yield of flour, we committed the serious error of deteriorating the quality of our flour.

The question of seeding wheat, therefore, resolves itself into finding productive varieties with sufficiently elongated kernels. Such wheat may be produced by applying the method of crossing different species of wheat, indicated by M. Vilmoren.

As to cultivation of the wheat, it is necessary, after having chosen a suitable seed, to do the very opposite of what is done in the cultivation of sugar beets, for the matter in wheat analogous to sugar is starch, the production of which must not be developed. If then the requirement for producing sugar is to plant the beet in a soil poor in nitrogen it follows that wheat must be planted in a sufficiently nitrogenous soil. This condition of cultivation is more easily obtained in beets than in wheat, for if there is, in the soil used for wheat, an excess of nitrogenous matter it is apt to lead to serious accidents in the germination of the wheat, which, however, may be avoided by employing superphosphates.

But if the wheat is sown in a soil where the nitrogen is too much exhausted, as, for instance, after beet roots, without taking the precaution of covering the wheat with a manure sufficiently nitrogenous in proportion to the mineral substances which it contains, the results will be a wheat, that ripens well and looks finely, considered as grain, but does not contain enough gluten.

In 1881, we sowed the same wheat, called White Victoria, in the same soil, at Luzancy, with the same complementary manures in three different conditions of rotation of crops, viz:

1. After sugar beets.
2. After oats, preceded by luzernes, for breaking.
3. After minette and use of dung, at the rate of 30,000 kilogr. per hectare. (2½ acres.)

We obtained wheats that were all different in aspect. The most beautiful in appearance was the wheat raised after beets.

In 1882, we harvested and milled each kind separately, and this is the result of analyses of the flour in a dry state made by M. L'Hôte.

	Nitrogen.	Gluten.
1. Wheat after beets.....	1.45	9.06
2. Wheat after oats and luzerne.....	1.61	10.06
3. After minette and direct manuring.....	1.68	10.10

It appears from this first experiment that the best appearing grain, the one after beets, was the least rich in gluten.

We then proposed to ourselves this question: Is it possible to enrich in gluten the wheat sown after beets, with the help of more nitrogenous manures? For the sake of a reply, we sowed, in 1882, the same Victoria wheat in the same soil after beets, but varying the quantity of manures. After harvesting and grinding them separately, M. L'Hôte has obtained the following results of his analyses of flours:

Kilograms.	Manure Employed on the Hectare.	Proportion of Nitrogen to Phosphoric Acid in the Manure.		
		Nitrogen	Phosphoric Acid	Gluten in Flour.
100	Sulphur of Ammonia.....	4-9	1.67	10.43
300	Superphosphate.....	5-9	1.82	11.87
200	Sulphate of Ammonia.....	12-9	2.04	12.75
300	Superphosphate.....	9-9	1.81	11.81

These results prove that it is possible to increase by cultivation the richness in gluten of wheat, and that this depends on the proportion of nitrogen to the mineral matter employed in the manure.

It is well known that the German method of cultivation, spreading the dung on wheat before beets, instead of placing it directly on the beets, produces a beet that is richer in sugar, because the dung, sufficiently buried beforehand, does not destroy the sugar already formed, by a slow growth. We are satisfied that this method, which presents certain difficulties of execution, nevertheless is equally favorable to the production of gluten in the wheat, provided a certain quantity of superphosphate is employed at the same time as the dung, for correcting any liability to deleterious influences on the wheat.

DECLINE OF WATER POWER AND ADVANCE OF STEAM POWER.

An interesting and highly suggestive phenomenon in the industrial progress of this country is the relative decline in the amount of water power as compared with steam power utilized for business purposes. This tendency is all the more suggestive by reason of the fact that no other country in the world is as well endowed with natural water power as the United States. Manufacturing enterprises usually seek water power, in a new country, because of its cheapness and availability, but when all the valuable powers have been absorbed by those who are determined to get a steady revenue from

them, neither of these two features of original desirability stand forth with much allurements. As water powers are improved they become more costly to the users; as steam power is improved it becomes less costly to the users.

In 1870 the census showed that there were more water wheels in use than steam engines, and that their horse-power was almost as much as the total horse-power of the engines. The census of 1880 showed more steam engines than water wheels, and a total power far in excess of the latter. The change is best shown in tabulated form, thus:

YEAR.	Water Wheels.	Horse Power.	Engines.	Horse Power.	Total.
1880.....	55,404	1,225,378	58,493	2,135,458	3,410,837
1870.....	61,018	1,130,431	40,191	1,215,711	2,346,143
Pr. ct. of in.	8.60	8.40	40.54	7	45.88

During the four years since the census was taken the progress of steam power has been greater than in any other four years of our history. What a census would now show as the relative decline of water power to be, or what the next census will show it to be, can be imagined after a study of the above figures.

The reasons for the great advance of steam power are not difficult to discover. Water power is not as reliable as it was before the forests were thinned out or cleared away, while, owing to improvements to engines and boilers, steam power is more reliable. Severe droughts and heavy floods have both operated to set at naught the business calculations of those dependent upon water power, while winter freezes and floating debris contribute to the annoyance and damage. The cost of dams is sometimes considerable. It is proposed to build a new one at Holyoke, to cost a million dollars, or a million and a half. The expense of land overflowed is often a large item in the cost of water power. As land becomes more valuable the cost of water power must increase. The application of power in industrial operations increases in a greater rate than the number of hands employed as shown by census returns, and the demand for steam engines and boilers is one that must inevitably keep pace with the development of the industrial resources of the country. It is a demand that has assumed elements of permanency.—*American Machinist*.

THE NATURAL GAIT OF THE HORSE.

We are asked by several members of the Cuvier Club to settle a dispute by deciding what the natural gait of a horse is. This is a question which goes to the root of breeding theories. It is admitted that the walk is natural to all, but what of the pace, the trot and the run? Stroll through the paddock with a breeder and watch closely the action of the foal. If it has been dozing in the sunshine one hundred yards from its dam, it will get up with sleepy eyes, lazily stretch its legs and start off in a walk, looking back at you inquiringly. Startle it a little and you will probably see it amble or pace. Startle it more, and it will move with greater swiftness in a trot. Rush at it with shouts and the clapping of hands, and you will in some cases cause it to break into a run. The unweaned colt is still the child of nature. It has not been molded by any school, by any training art. All the gaits struck by it, therefore, must be natural. Some horses, as they ripen, show a preference for the fast trot, others for the fast pace, and others still for the fast run. These gaits are interchangeable, and the preference frequently depends as much upon foot balancing as upon conformation. Some horses fall off in speed when they change from the trot or pace into a run. Others increase their speed in making the same change. The two fastest trotting horses in the world, taking the record for our guide, are a combination of what are termed pacing, trotting and running strains. They are living evidence that great and harmonious results can be obtained by a proper blending of the three strains which are presumed to furnish us in their

individuality with three natural gaits. One man breeds to intensify the trotting disposition, a second man to confirm the pacing tendency, and a third man breeds to increase the running habit. In moving to his objective point he studies form and temperament as well as other ancestral traits. And the effort to develop certain characteristics at the expense of other traits brings us face to face with the philosophy, the hotly-debated theories of breeding. We shall not stir the cauldron now. We prefer to answer the question briefly. All gaits used by the foal are natural to it, but the gait at which the horse excels depends upon the ancestry and the training school.—*Turf, Field and Farm*.

SOME USEFUL NOTES FOR ENGINEERS.

Among the questions most frequently asked of our inspectors when making their ordinary visits, are the following, which are of such general interest to engineers as to warrant publication:

1st. How much water per pound of coal should be made into steam at 60 pounds pressure per square inch with 60-inch tubular boilers properly made, well set, and carefully fired? Under the above conditions, from 8 to 10 pounds, dependent somewhat, of course, upon the quality of the coal and the temperature of the feed water.

2d. How much more coal per pound of water does it take to carry 80 pounds per square inch than it does to carry 60 pounds per square inch? This question could with more propriety be put as follows: How much more heat does it take to make a pound of steam at 80 pounds pressure per square inch than it does to make a pound at 60 pounds per square inch? Practically, no more coal will be required; theoretically, about 4-10 of one per cent., or about 1-250th part more.

3d. Do you get enough better results from steam of 80 pounds per square inch than you do from steam at 60 pounds per square inch to pay the extra wear and tear of boiler and engine? Depends entirely upon conditions. If you can make use of steam at 60 pounds pressure it pays to use it; there are conditions, however, where 60 pounds, or even less, would be decidedly more economical.

4th. How much more heat do you get from pipes carrying 60 pounds pressure than from pipes carrying 10 pounds pressure? Two and one-tenth per cent. more heat will be given out per pound condensed from steam of 60 pounds pressure than from steam at 10 pounds pressure, in falling from temperature due to the respective pressures to 212° Fahr.

5th. What proportion of direct heating surface to the volume of a fairly protected room is required to maintain the temperature of the room at 60° Fahr. in buildings heated by steam? From 1-75th to 1-250th, according to size and exposure of the room.

6th. How much is a given amount of steam reduced in bulk by compressing it from 60 pounds per square inch to 80 pounds per square inch? About 20 per cent. See any steam table.—*The Locomotive*.

AN IMPORTANT COURT DECISION.

A very important decision on roller mill patents was rendered Sept. 17th, by Justice Mathews and Judge Sage in the United States Circuit Court for the Southern District of Ohio. It is a case of the greatest importance not only to the parties to the suit but to millers throughout the country. It was a case of Stilwell & Bierce Manufacturing Co. against Stout, Mills & Temple. The principal points involved in the case were the mechanical devices for simultaneously spreading apart the rolls and shutting off the feed by means of a through shaft, and the retaining of the adjustment of the tension springs; all of which are covered by the Odell patent, under which the Stilwell & Bierce Manufacturing Company have the sole right to manufacture. The case was tried before Judge Mathews of the United States Supreme Court, and the Odell patent sustained, and the "Livingston" roller mill manufactured by Stout, Mills & Temple held to be an infringement.—*Dayton (O.) Daily Journal*.

UNITED STATES MILLER.

PUBLISHED MONTHLY.

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MILWAUKEE, NOVEMBER, 1884.

ANNOUNCEMENT:

WM. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLIG & Co., 449 Strand, London, England, are authorized to receive subscriptions for the UNITED STATES MILLER.

We send out monthly a large number of sample copies of the UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE UNITED STATES MILLER to you for one year.

The United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices, where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

TO ADVERTISERS.

Milwaukee Wis., October, 1884.

To Those Interested in the Flouring Trade:

THE UNITED STATES MILLER is now in its ninth year, and is a thoroughly established and much valued trade paper. It has a large regular list of domestic and foreign subscribers. It is sent monthly to United States Consuls in foreign countries, to be filed in their offices for inspection by visitors. It is on file with the Secretaries of American and European Boards of Trade for inspection of members. Aside from the above, thousands of SAMPLE COPIES are sent out every month to flour mill owners who are not subscribers, for the purpose of inducing them to become regular subscribers, and for the benefit of those advertising in our Columns. Every copy is mailed in a separate wrapper. Our editions have not been at any time since January, 1883, less than 5,000 copies each, and are frequently in excess of that (see affidavit below). We honestly believe that the advertising columns of the UNITED STATES MILLER will bring you greater returns in proportion to the amount of money invested than any other milling paper published. Advertisers that have tried our paper for even a few months have invariably expressed themselves well satisfied with the results. Our advertising rates are reasonable. Send for estimates, stating space needed. The subscription price of the paper with premium is One Dollar per year. Sample copy sent free when requested. We respectfully invite you to favor us with your patronage. We shall be pleased to receive copies of your Catalogues, and also trades items for publication free of charge. Trusting that we may soon be favored with your orders, we are,

Yours truly,

UNITED STATES MILLER.

E. HARRISON CAWKER, Publisher.

"MILL FOR SALE" ads. inserted once for \$2.00, or three times for \$5.00, cash with order.
 "SITUATION WANTED" ads. 50 cents each insertion, cash with order.

Publisher's Affidavit Concerning Circulation.

STATE OF WISCONSIN, ss.

MILWAUKEE COUNTY, ss.

E. HARRISON CAWKER, editor and publisher of the United States Miller, a paper published in the interest of the FLOURING INDUSTRY at No. 124 Grand Avenue, in the City of Milwaukee and State of Wisconsin, being duly sworn, deposes and says that the circulation of said paper has at no time since January, 1882, been less than FIVE THOUSAND (5,000) copies per month; further, that it is his intention that it shall not in the future be less than FIVE THOUSAND copies each and every month; further, that he has paid for regular newspaper postage at the rate of two (2) cents per pound on domestic and Canadian newspaper mail for the last eight (8) months, including May, 1884, the sum of \$160.90, showing that in that time 8,045 pounds of United States Millers have been mailed; further, that the foregoing postage paid does not include postage paid on city and foreign papers (Canada excepted). [Signed]

E. HARRISON CAWKER,
Publisher United States Miller.

Subscribed and sworn to before me, this 30th day of June, 1884.

B. K. MILLER, Jr., Notary Public,
Milwaukee County, Wis.

Amount of postage paid for June, \$18.26; July, \$17.62; August, \$17.58; September, \$17.66. Affidavits will be sent to advertisers from time to time. The original post office receipts can be seen at any time in this office.

LARGE LOAD OF FLOUR.—A steamer left San Francisco recently with 1,000 tons of flour on board. Her destination was China. The war with France has made the Chinese good customers of the wheat growers of the Pacific coast.

A GERMAN edition of the report on the comparative experiments on different milling systems to the syndicate of grain and flour in Paris is in preparation by Boyoljub Loowe, editor of the *Ungarische Muehlen-Zeitung* in Budapest. We have before called attention to the importance of this report, which, in a German dress, will, no doubt, be also extensively read in this country.

Of the wheat imported into Great Britain for seven months in 1884 the United States furnished 13,773,980, a little over half, India less than one sixth, Russia about one-tenth, Australia less than one-tenth; 876,057,000 pounds of flour were imported in the seven months; of this the United States sent 599,603,800 pounds.

A CEMENT of three parts of fine coal ashes, one of red-lead, three of sand and two of chalk, by weight, made into a putty with oil, is excellent for filling up the exposed joints of stones and bricks. It is said to become as hard as marble.

THERE are 3,985 paper mills in the world, which turn out annually 1,904,000,000 pounds of paper. Half of this is used in printing generally, while 600,000,000 pounds are used for newspapers. An average of eleven and a half pounds is used by every Englishman, and ten and a quarter pounds by every American.

THE Hudson River Tunnel about which so much was said a few years ago, and in undertaking the construction of which upwards of \$1,000,000 was expended, has long since been abandoned, and, very likely, forever. The company met with almost insurmountable difficulties from the start. The excavation that was made is full of water.

THE CHEMISTRY OF BREAD-MAKING.

BY PROFESSOR CHARLES GRAHAM, D. SC.,
F. I. C.

The cereals are undoubtedly the most valuable of all the fruits of the earth, and it is, therefore, needful that we should rightly study their mode of preparation for the use of man. The question may have occurred to some of you, how can science aid? Surely a good baker requires no assistance from science. Let us see what is the answer to it. Without going through a number of instances in which undoubtedly science has advantaged art, I will refer only to one or two. In the first place, there is no doubt that agriculture has benefited largely by the investigations of Liebig, and, following him, of others, into the composition of the mineral matter of plant life. It is perfectly true that in metallurgy, steel was obtained ages ago of the very highest excellence. Yet surely the study of chemistry has enabled us to manufacture iron and steel at such a price and in such quantities as would have been utterly impossible in the olden time. Again, take another illustration, that of dyeing; there are two methods of dyeing of great historical interest—that of Turkey red dyeing and that of indigo dyeing—because these are the only two really permanent colors, and secondly because science has investigated the nature of Turkey red dyeing, and has found out that the important principle in the madderroot was alizarine. Science has not stopped at merely finding the nature of dye; science has succeeded in creating the dye out of gas-tar products. Lately, indigo has in a similar way been created, it is always a success, and will soon become a great commercial success. I give those merely as illustrations of the way in which science can benefit art, and though we need not look for any such startling, such epoch-making discoveries as that of the making and building up alizarine and indigo, still I feel sure that science little by little will greatly improve the art of bread-making.

I have the honor of addressing some London bakers, and there are London bakers who are exhibitors in this Exhibition, and it is perfectly true that we now get in London bread of the highest excellence, but still the Council of this Exhibition are not thinking only of the best West-end bakers,—they are not limiting their views, only of the West-end bakers, they are considering the interests of the United Kingdom, and, indeed, of other countries, and one of the arrangements I understand in regard to these lectures is that they shall be published in a very cheap form, so that in this way one's audience may be larger than that in this room. I had proposed to make a few remarks in regard to the history of bread-making, but, after the introductory remarks of our Chairman I think I need do no more than briefly enumerate the three distinct stages. First, flour was mixed with water, baked, and then eaten; the next improvement was the discovery of leaven; both of these are very old methods for the treatment of flour and known to the ancients; and at the present day we have examples of both systems; we have bread without any ferment at all, as in parts of Spain, and we have also leaven bread in the North of Europe, but the next great and important improvement was the use of yeast. This has occurred in more modern times, how many hundred years

ago I know not, but still comparatively modern has compared with the older methods.

AVERAGE COMPOSITION OF THE GRAIN OF CEREALS.

	Old Wheat.	Barley.	Oats.	Rye.	Maize.	Rice.
Water.....	11.1	12.0	14.2	14.3	11.5	10.8
Starch.....	62.3	62.7	56.1	54.9	54.8	78.8
Fat.....	1.2	2.6	4.6	2.0	4.1	0.1
Cellulose.....	8.3	11.5	1.0	6.4	14.9	0.3
Gum and Sugar.....	3.8	4.3	5.7	11.3	2.9	1.6
Albuminoids.....	10.9	18.2	16.0	8.8	8.9	7.2
Ash.....	1.0	2.8	2.2	1.8	1.6	0.9
Loss, &c.....	0.8	1.0	0.2	0.5	0.7	0.4
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

COMPOSITION OF WHEAT GRAIN ASH.

	Lawes and Gilbert.	Way and Ouston.
Phosphoric acid.....	49.68	45.01
Phosphate of iron.....	2.36	0.82
Potash.....	39.35	31.44
Soda.....	1.12	2.71
Magnesia.....	10.70	12.38
Lime.....	3.40	3.62
Sulphuric acid.....	0.34	0.08
Carbonic acid.....	0.13	0.13
Chlorine.....	0.13	0.13
Silica.....	2.47	3.67
Total.....	99.21	100.02

Before studying the phenomena of bread-making, it will be necessary to study the composition of the cereals employed in bread-making. In the corner of the room there is a table taken from papers published by Messrs. Lawes and Gilbert, giving us the composition of wheat, barley, oats, rye, maize, and rice.

I wish to draw your attention to some important points connected with those analyses. We may divide the constituents of the cereals of wheat, for example, into the mineral matter, and the matter which is not mineral, and to which we give the term organic matter. The mineral consists of phosphate of potash, and of magnesia, about one-half being phosphoric acid, one-third potash, and one-tenth magnesia. The organic constituents consist of what are termed carbo-hydrates, together with a small quantity of fat. I say carbo-hydrates, an expression used to indicate that in these bodies the carbon, the hydrogen, and the oxygen are united together to form the substance, starch, for example, and that the hydrogen and oxygen are in the same proportion as in water, though they are not combined together as in water, and therefore, the expression carbo-hydrates is given to such bodies. These carbo-hydrates are the substances that yield heat to the body, and by so doing yield force, power. In addition to these we have the substances termed albuminoids. These are also spoken of as flesh-formers. Now, it is perfectly true that this expression correctly describes the function they perform, namely, to repair the waste of the muscular tissue, but at the same time it is somewhat misleading, in that these flesh-formers are really mainly used up in giving heat and force by their burning or oxidation in the body, only a comparatively small quantity being necessary for the waste of the muscular tissues, which is by no means so great as physiologists formerly assumed.

Starch occurs stored up in vegetable structures for much the same reason as fat occurs stored up in animal structures, namely, for future use; thus we find starch in bulbs, and in tubers. It is the starch-yielding property of the potato which renders it chiefly valuable. We find it also in roots, such as turnips, and the beet-root; we find it, of course, in seeds, and lastly we find it in the thick leaves termed by botanists, cotyledons, the two thick leaves which in leguminous plants, such as the bean and the pea, form the larger part of the seeds. The whole of the matter inside the testa or skin of the bean really consists of the two thick young cotyledon leaves; thus we have various sources of starch. Starch, however, obtained, will be found, when examined under a microscope, with a proper measuring arrangement, to have different characteristic appearances, and also sizes. For example, the starch of wheat varies much from that of barley, and very much from rice. It is by the size, which can be accurately measured, and by the form or shape which we can note under the microscope, that we are enabled to identify various kinds of starches. Starch, as you know, does not dissolve in cold water, and indeed water is used in the extraction of the starch after grinding the grain, or rasping the potato from which we are deriving the starch. But when to a mixture of cold water and wheat-starch a laundress pours boiling water, she raises the temperature, and the result is that the starch cell bursts. The outside of the cell is composed of woody fibre, and at this higher temperature it bursts, the internal contents of the starch cell then come out. To those contents we give the term granules, which makes a paste with the hot water. This is an important point in regard to the digestion of starch. At a temperature of about 300 degrees F. starch is converted into dextrine, or British gum. If, however, instead of employing that plan you add, to a

thick starch paste a little ground malt, the ground malt will convert the starch paste into dextrine, together with another product which I will refer to presently. But the dextrine formed in that way is not pure. A still better plan is to make a mixture of 1,000 parts of starch with 300 of water, to which previously two parts of nitric acid have been added; you mix the two together, and this is afterward air-dried, and when it is revolved in a cylinder at the temperature of not higher than 220 degrees to 230 degrees, it is converted into dextrine, and it is in that way that the dextrine of commerce is now manufactured. You are all acquainted with the appearance of it, because you have all of you seen the 1d. or 2d. bottles of British gum; it is on the back of every postage stamp, and it is used very largely in the arts, in calico-printing, for example. Closely allied to starch and dextrine come cane sugar and maltose sugar. Cane sugar, you know, is derived from the cane plant, from the beet, or from the maple, its properties you are sufficiently well acquainted with, namely, that it is sweet, and dissolves in water and crystallizes easily. Maltose sugar is what I was referring to just now when I said that on the addition of a little malt to starch paste there was another product formed besides dextrine, and that product is maltose, having the same centesimal composition as cane sugar. Maltose sugar was discovered by Debrunfaut, and was afterwards the subject of experiment and study by Musculus, but it was not until comparatively recently, owing to the researches of Mr. O'Sullivan, of Burton-upon-Trent, that we really understood the nature of the change that took place by the action of these albuminoid bodies, such as we find in malt, upon starch paste. He showed us that a starch solution is acted upon by the diastase, as it is called, of the malt, and that it takes up water and forms maltose sugar and dextrine, the maltose sugar having the same formula as cane sugar. This process continues, and more maltose is formed by the action of the diastase upon the more complex dextrines which are formed at first. Ultimately, however, a large portion of maltose is formed, and a very small quantity of dextrine, and under the most favorable conditions it is possible to convert the whole of the starch into maltose sugar. The maltose sugar thus made, dissolves in water, it is slightly sweet to taste, and it does not crystallize in the way that cane-sugar does, and is much more difficult to obtain in a crystalline form. Maltose sugar is readily acted on by the yeast ferment.

The next matter of interest in the study of these bodies is the albuminoids; the albuminoids contain carbon, hydrogen, and oxygen just in the same way, but not in the same proportion as the carbo-hydrates, but they have in addition nitrogen, and sometimes a little sulphur. Their general composition is given in this table:

AVERAGE COMPOSITION OF ALBUMINOIDS.

Carbon.....	53.3
Hydrogen.....	7.1
Nitrogen.....	15.7
Oxygen.....	22.1
Sulphur.....	1.8
Total.....	100

Hypothetical formula, $C_{73}H_{123}N_{18}SO_{22}$.

If we take the formula of starch as being $C_{73}H_{123}O_{66}$, you may not see any relationship between that and the albuminoids, but yet the probabilities are that the starch is only an altered form of the albuminoid, and that it has previously through such an albuminous stage. In the table, by Lawes and Gilbert, you will find that the albuminoids are given there for different cereals. At the same time, as we shall see presently, cereals differ very much in the percentage of albuminoids they contain, and in the table the placing of 10.9 of albuminoids to old wheat was perfectly correct for the sample of wheat analyzed, but it leads one to assume that wheat is less rich in albuminoids than barley and oats, but it is distinctly on the average not less rich, but rather more so than barley. If we take ordinary flour, and then elutriate it with water so as to get rid of the starch, we shall ultimately obtain crude gluten. The crude gluten, of which we have some samples on the table, is a tough elastic mass, and it is on account of this great resisting tendency that we are enabled to keep in the carbonic acid that is subsequently formed in fermentation, and thus to make a well-piled loaf. Now crude gluten contains fibrine and gluten; about four-fifths of fibrine and one-fifth of gluten; the gluten is slightly soluble in water, but not the fibrine. Of course, if fibrine be moistened and left for a time it will gradually break down in the complexity of its structure, and will form simpler kinds of albuminoids, and this is the kind of deleterious action that takes place when we have a long-continued period of wet weather at harvest time. But while washing the flour in order to obtain this crude gluten, we have already dissolved out some soluble albuminoids.

(To be continued.)

THE ENGINEER'S MURDER.

BY HENRY MORFORD.

Yes, I once committed a murder,
Outside the realms of law,
That I s'pose the body of people
Would not heed the worth of a straw;
But I think I should sleep the sounder,
Sometimes, when the night winds wail,
If I never remembered "murder,"
Or never told over the tale.

No matter the road I was running—
'Twas in one of the Middle States;
So many years since, that I wonder
Why the sorrow never abates.
I was young, and hasty, and savage,
As youth is apt to be,
And my hand,—well, my hand, you will fancy
Was a trifle too ready and free.

I was in my caboose just at evening,
Say 'tween Holden and Fiddler's Run,
Making time, to reach Wayman's Siding
For the up-train, at five twenty-one;
I had had a hot box at Grossman's,
And that put me four minutes behind;
So I felt like,—the word is ugly,
But the truth!—like "going it blind."

Round a curve, and running,—say forty,
Or it may have been fifty, who knows,—
And there on the track before me,
A black fiend, at full scream, arose!
A dog, that sat down in the middle,
Between the two lines of rail,
And howled like a fiend incarnate,
With a mixture of bark, yell and wail.

Did I stop? Not much! I just opened
The throttle valve, by a mite,
And over that dog she went flying,
And over something else,—white!
I stopped her then with a shudder,
And ran back; in a mingled heap
Lay the dog, and what had been lately
A baby-girl laying asleep!

Have I never got over it? No, sir!
And I never shall till I die!
Why didn't I heed the warning?
It was only a black dog's cry,
I may have done many more murders,
And 'tis likely I have on the whole;
But there's none, when the night winds are howling,
That lay such a weight on my soul!

And what is the worst of my sorrow,—
Don't make the one grand mistake!
I shouldn't grieve twice, I've a fancy,
For the poor dead baby's sake!
But the dog that was doing his duty
So nobly,—I grieve for him;
And I never tell over the story
But I find my old eyes grow dim.

Written for Steam Engineering.

BOOK NOTICES.

We have received a copy of an essay by Wm. Jago, F. C. S., F. I. C., entitled, *Technical Education for Millers and Bakers*. This essay shows clearly the advantage of thorough education and training for millers and bakers. Mr. Jago is head master of the Brighton (Eng.) School of Science, and has during the past year or two delivered courses of lectures of great interest to the milling trade.

The edition of the November *Century* will be the largest ever printed of that magazine. Besides the first chapters of Mr. Howell's new novel, "The Rise of Silas Lapham," the story of an American business man, its fiction will include "A Tale of Negative Gravity," by Frank R. Stockton; "Free Joe and the Rest of the World," an illustrated story by Joel Chandler Harris, and "The Lost Mine," by Thos. A. Janvier, with a full-page picture by Mary Hallock Foote.

We acknowledge the receipt from the Treasury Department of a copy of annual report on foreign commerce of the United States for the fiscal year ended June 30, 1884, prepared by Joseph Nimmo, Jr., Chief of Bureau of Statistics.

Technical Education for Millers and Bakers, is a valuable essay published by Mr. Wm. Jago, of Brighton, Eng. It is replete with suggestions of the importance of technical education.

The present year is the centenary of the re-organization, after the revolution, of the educational system of New York State. A grand scheme was devised, it is said, by Alexander Hamilton, by which the Board of Regents was created, for the purpose of promoting the organization of academic as well as common-school education in every county in the State. The whole system was to be crowned by Columbia College, as King's College was patriotically re-christened, of which the Regents were made the trustees. The scheme came to more on paper than it did in reality, but nevertheless it gave a stimulus to education in New York that has been felt ever since. An interesting account of this plan is contained in a paper on "Columbia College," to appear in the November *Harper's*, taking up the history of that institution where it was left by the article on "King's College" in the October number. The latter portion of the history of the college shows an interesting example of modern progress, especially in connection with its new library system, of which a detailed description is given.

NEWS.

Elizabeth, Minn., is soon to have a 175-barrel mill.

C. Smith, of Campbellford, Ont., has finished his mill.

J. A. Gambrill's mill, at Baltimore, Md., is to be enlarged.

Finch & Welborn, of Lexington, N. C., are building a flour mill.

The Washburn Mill, at Minneapolis, will put in a Wright engine.

Manitoba farmers are getting sixty cents per bushel for No. 1 hard.

The new mill of Lyer & Mayhew, at Thamesville, is nearly completed.

Flour from the Rochester (Minn.) mills will be on exhibition at the New Orleans Exposition.

The Crosby Mill, at Topeka, Kas., has started up with increased capacity of 500 barrels per day.

The Pillsbury "A" Mill, in Minneapolis, recently turned out 5,468 barrels in twenty-four hours.

At a sale of government property at Harper's Ferry the Potomac water-power brought \$25,000.

Reed & Bischoff, of Stanwood, Mich., have just started up a new seventy-five-barrel roller mill.

The Ogilvie Milling Co., of Winnipeg, have wheat-buyers at thirty-six railway stations.

The Bufaula (Ala.) flour mills, which burned recently, will be rebuilt at once.

The flour mills of R. H. Dulaney, at Middleburgh, Va., are to be enlarged and improved.

D. Barron, of Amherstburg, Ont., has been changing his mill and adding new machinery.

The "Kent Mill," at Chatham, Ont., which was burnt some time ago, is replaced by a 350-barrel mill.

Thomas Parker, of Sombra, has bought the "Fred Flour Mills," near Strathburn, Ont., of McLean & Miller for \$4,250.

A. Wolverton & Co., are running their mills at Wolverton, Ont., day and night, and do not intend to close down this season.

It is stated that the farmers of Whitewood, Man., would give a liberal bonus towards the erection of a good mill at that place.

L. C. Porter, of Winona, Minn., has been appointed to take charge of the Minnesota flour exhibit at the New Orleans Exposition.

Harrington & Smith's, of Pleasantville, Ia., will rebuild with a capacity of seventy-five barrels per day. Their mill was burned September 26th.

The architects of the West will meet in Chicago on the 12th of November for the purpose of forming a Western association of architects.

Bread baked from flour made on the Case system in the mill of Adam Simpson, Owatonna, Minn., took the first prize at the late Minnesota State Fair.

An English firm is now making casks and barrels of steel. They are said to be lighter and more durable than wood.

Mr. Carvith, of Pouty Pool, Ont., has made great changes in his mill, and added a general supply of milling machinery.

The Geo. T. Smith Purifier Company, of Stratford, Ont., supplied the purifiers and other machinery for Cooper's mill, at Belleville.

In the French Chamber of Deputies a bill has been introduced to levy on foreign corn a duty of five francs per 100 kilograms.

One hundred and twenty-five thousand bushels of wheat have been shipped East from Manitoba via Port Arthur since harvest.

By the breaking of a dam, October 20th, the streets of Ansonia, Ct., were flooded, and all movable articles swept into the Naugatuck river. At one time the water was four feet deep on the streets.

The new elevator erected by Mr. Geo. A. Stewart, of Winnipeg, Man., for the Bell Farming Company, at Indian Head, had the first trial October 10th, and succeeded in putting through fifty bushels in two minutes, and has a capacity of 50,000 bushels.

The Mebane Milling Company, Durham, N. C., with a capital of \$500,000, has bought the Tate & Trolinger flour mills, at Mebane, same State, and after enlarging the buildings and putting in requisite machinery, will engage in several manufacturing pursuits.

Messrs. Campbell & Stevens, of Chatham, Ont., have completed their large grist mill. The Geo. T. Smith Company, of Stratford, furnished the rolls and purifiers and other machinery of the latest improved pattern. The mill is one of the finest in the Dominion.

Nashville, Tenn., claims a population of 70,000 inhabitants, and hopes to have 100,000 within five years. It is the greatest educational center for the South, having no less than eight colleges. It has 700 manufacturing establishments. Nashville is one of the wealthiest cities in the South.

Gavin Hume, a very extensive miller at Galt, Ont., has made an assignment. His business career covered over a period of twenty-five years, and he was considered financially strong. The cause of the sudden collapse was through the foreclosing of a mortgage held by a Glasgow firm against his mill and property. His liabilities are about \$70,000, with a like amount of assets.

In the register of deeds office there was recorded, October 21st, a document which was given by the sheriff of Outagamie county, Wis., conveying \$25,000 worth of water-power property, at Kaukauna, including mills thereon, known as the Stovenek property, to William Van Northwick, of Batavia, Ill. For years the property has been in law, and many deeds have been given to various parties who have loaned money. Mr. Van Northwick was a stockholder in the concern.

A millwright by the name of Edward Chatfield, of Waterbury, Ct., has a peculiar mania. At frequent intervals he would appear in the road in secluded places, stark naked, as ladies were driving past. For a long time he eluded all attempts to capture him, and it was not known who he was. Finally, however, a couple of shrewd detectives secured him in a nude condition. He is said to be an excellent mechanic, is well off, and has an interesting family.

Wheat from Manitoba is now pouring into Montreal via the Canada Pacific Railroad. Part of it is for local milling purposes, and the remainder for shipment. About four million bushels are expected during the winter from the same quarter, and the new elevators on the wharves are being pushed rapidly to completion.

October 23 the machinery in the Wabash (Ind.) flouring mills came to a sudden stop, and upon investigation it was found that seven large eels, each nearly four feet long and weighing seven pounds, had entered the turbine wheel, which supplies the motive power for the mill, and choked it up. In the afternoon the mill again stopped abruptly, and the turbine was a second time found full of eels. This time nine, weighing in the aggregate sixty pounds, were removed from the wheel. The eels enter the old Wabash canal from the Wabash river at Lagro.

A number of new elevators are to be built at Minneapolis next season, to accommodate the increasing grain business of the northwestern States. The Northern Pacific Railroad Company will erect one with a capacity of 4,000,000 bushels; the Minneapolis Elevator Company will erect two, each with 1,500,000 bushels capacity; the Chicago, St. Paul, Minneapolis & Omaha Railroad Company will provide one to hold 500,000 bushels, and the Chicago, Milwaukee & St. Paul Railroad Company will build one of 1,000,000 bushels capacity.

The S.S. Neptune, despatched by the Dominion Government in July last to Hudson's Bay, to

assist in determining the navigability of the Bay and Straits, returned to St. John's, N. F., on Saturday last. Her voyage has been a pleasant one, attended by scarcely a mishap. Her voyage has done much to show how simple would be the navigation of these waters, were proper charts available. A number of observation stations were established, from which we will doubtless get interesting facts next summer, which will divest the bay and straits of a few more of their imaginary errors.—*The Commercial* (Winnipeg).

A Milwaukee capitalist will make a novel experiment near Aberdeen, Dakota, this fall. An artesian well has just been completed that flows 3,000 gallons a minute, equal to 108 horse power. Another will be made large enough to run a mill capable of making 200 barrels of flour a day, and the experiment of artesian well power as a perpetual motor will be made. The result will be carefully watched.

The three Washburn mills at Minneapolis use between 450 and 500 gallons of lubricating oil per month. This consists mostly of lard and machine oil, only a small quantity of castor and sperm being used. In the Washburn A mill five regular oilers are employed, there being a head man and two for each watch. They look after all heavy bearings and the rolls, while on lighter machinery the attendants themselves do the oiling. In the other two mills there are only two regular oilers—one for night and one for day—the rolls and lighter machinery receiving care from the men attending them.

MANITOBA ITEMS.—During the past month the Portage la Prairie Milling Co. have ground about 20,000 bushels of wheat and have purchased about 40,000 bushels already this season, and the new storehouse in connection with the mill is almost completed. Thirty thousand bushels of wheat have been purchased in Emerson by the Ogilvie Milling Co. The mill on the Shell river, the property of the Mississippi Milling Co., is being converted into a roller mill. The machinery and mechanics are expected to arrive at Moosomin in a few days.

MILLS BURNED DURING OCTOBER.—Joseph Hicks, Patton, Mo.; insured. J. B. Dale, Dodd City, Tex., by incendiaries, October 7th; loss, \$8,000. S. Routzong, Covington, Ky.; loss, \$20,000; insured, \$15,000. S. J. Johnson, Waynesboro, Ala.; loss, \$3,000. Blandin & Co., Ft. Dodge, Ia., with 2,000 sacks of flour and 10,000 bushels of wheat, October 7th; loss, \$75,000. Walton Bros., Fairburg, Ill.; loss, \$25,000; insurance, \$10,000. October 2d, Walsh, DeRoo & Co.'s mill, at Holland, Mich., was damaged by fire to the extent of \$8,000; loss on stock, \$8,000; fully insured. October 9th, the Imperial Mill, owned by L. Blandin & Co., at Ft. Dodge, Ia., burned; the mill was valued at \$45,000, and the stock destroyed at \$10,000; insurance on mill, \$25,000; on stock, \$5,000.

The Case Manufacturing Company of Columbus, Ohio, have received the following orders during the month: From J. C. Crenshaw, Charleston, Mo., for a full outfit of breaks, rolls, purifiers, centrifugals, scalpers, bolting reels, etc., for a complete gradual reduction mill, on the Case system, using twelve pairs of rolls; from A. M. Stevens, Dyersburg, Tenn., who has been contemplating changing his mill to the roller system, and after investigating the different systems, and examining the different machines at the St. Louis Exposition, and accordingly gave them the order for a complete outfit of breaks, rolls, purifiers, centrifugals, etc., for a full roller mill on the Case system, using fourteen pairs of rolls; from Richter & Co., Williamstown, W. Va., for one three-roll break machine; from John Black, Sycamore, Ill., for one Case improved centrifugal roll; from Dietley & Son, Mooreheadville, Pa., an additional order for one centrifugal reel; from the Albion Mills Co., Albion, Mich., for one patent automatic feed for their Allis roll. Geo. Graham, Trenton, Mo., writes them: "Your automatic feed would cover a multitude of sins if the rolls had them." From Wisner Bros., for one pair rolls with patent automatic feed; from G. J. Burrer, Sunberry, O., for two pair rolls and other machinery; from D. Smith, Hayesville, O., who is making some changes in his mill, an order for three pairs rolls with patent automatic feed; from Wood & Kenyon, Onawa, Ia., two pair of rolls with patent automatic feed; from C. W. Ellis, Dubois, Ind., for a complete outfit of breaks, rolls, purifiers, centrifugal reels, scalping reels, bolting chests, etc., for a full roller mill on the Case system, twelve pair rolls will be used, and the mill, when completed, will have a daily capacity of sixty to seventy-five barrels; from Leggett & Co., Centerville, Ind., for two pair of rolls with automatic feed; from S. L. Ellis & Co., Hopkinsville, Ky., for two pair of rolls with patent automatic feed; from Flenekin Turbine & Co., of Dubuque, Ia., for two pair of rolls and one No. 1 double purifier, with patent automatic feed, to be shipped to E. Maskery & Son, Marquette, Ia.; from W. I. Pyne, Louisville, Ky., for nine sets of rolls, with patent automatic feed; from Cox & Funkhouser, Jonesboro, Ind., for a complete line of breaks, rolls, purifiers, centrifugals, scalpers, bolting chests, etc., for a full roller mill on the Case system, using twelve pair of rolls with patent automatic feed; from the C. A. Gambrill Manufacturing Co., Baltimore, Md., for six feed boxes for their purifiers—this makes over twenty Case automatic feed boxes that the Gambrill folks are using on different purifiers; from Kerfoot Bros., Des Moines, Ia., for four sets of rolls, with patent automatic feed; from J. B. Ficklin, Fredericksburg, Va., an additional order for one set of rolls, with patent automatic feed; from M. Jones & Son, Beacon, Ia., two pair rolls, with patent automatic feed; from A. B. Welkins & Son, Patalaska, O., who are making some changes in their mill, one "Little Giant" break machine and scalpers, combined, and two pair rolls, with patent automatic feed; from W. McKellop, Perry, Mich., for one Case improved centrifugal reel, and two pair rolls, with patent automatic feed; from Chas. Emke, Fredonia, N. Y., for an outfit of breaks, rolls, purifiers, scalpers, centrifugals, bolting chests, etc., for a full roller mill on the Case system, using twelve pair rolls, with patent automatic feed. They have also shipped to A. B. Childs & Son, London, Eng., two sets rolls and one No. 1 double purifier, with patent automatic feed; and to J. S. McCray & Co., Omaha, Neb., one No. 1 double purifier, with patent automatic feed, and are furnishing J. W. Scott, Bentonport, Ia., with breaks, rolls, purifiers, etc.; from Click & Mills, Dayton, O., for breaks, rolls, scalpers, centrifugals, etc.; from Castree, Mallory & Co., Flint, Mich., for two pair of rolls, for Howard's Mill, at Flint; from A. B. Childs & Co., London, Eng., for breaks and rolls; from Simpson & Gault, Manufg Co., a break machine for the mill at Medora, Ind.; from A. Hulshizer, Utica, O., for eleven sets of rolls and a complete line of machinery for a mill on the Case system; from A.

Comingo, Pleasant Hill, Mo., for two pair rolls and a Case centrifugal; from J. Gregg, Blanchester, Mo., for a "Little Giant" break machine; from W. D. Masie, Canton, Ill., for a pair of rolls; from B. M. Allison, Fairview, W. Va., for breaks, rolls, scalpers, centrifugals, etc.; from Joseph Biers, Fredericktown, O., for a purifier; from M. Clapp, Rogersville, Mich., for two pair rolls and purifier; from Lucas & Atkins, Unionville, O., for milling machinery; from J. S. Murphy, for patent feed and purifiers; from Collins & Black, Baugh, Tex., for two pair rolls and purifier; from H. Mulzer, Powell, O., for purifiers and rolls; from K. C. Arnold, Truxton, N. Y., for rolls; from S. S. Cline & Co., Gallatin, Mo., for a complete ten-roller mill, on the Case system; from F. L. Burdick, Owatonna, Minn., for patent feeder for purifiers; from D. Narracong, Evansville, Wis., for one set of rolls.

The following orders for the Celebrated Gray's Noiseless Belt Roller Mills have been received during the past month by Edward P. Allis & Co., of the Reliance Works, Milwaukee, Wis.: Bryan & Wheaton, Plankinton, D. T., a Gray's noiseless belt roller mill; George Rathel, Lincoln, Ill., seven pair of Allis rolls, in Gray's noiseless belt frames; Plymouth Roller Mill Co., Lemars, Ia., twenty pair Gray's rolls, in Gray's noiseless belt frames; A. McMurtrie & Co., Belvidere, N. J., a Gray's noiseless belt roller mill; White & Baker, Pittsford, N. Y., a No. 3 four-break reduction machine, Gray's noiseless belt roller mill, and other machinery; James Cummings, Lyn, Ont., six pair Allis rolls, in Gray's noiseless belt frames; A. Colburn & Son, New Cassel, Wis., six pair Allis rolls, in Gray's noiseless belt roller frames; Burroughs & Piersons, Flint, Mich., a Gray's noiseless belt roller mill; Kiddoo Bros., Neosho, Mo., eight pair Allis rolls, in Gray's noiseless belt frames, Gray centrifugal reels, Gray purifiers, and complete outfit for an all-roller mill; Gehlen Bros., Lemars, Ia., a Gray's noiseless belt roller mill; J. P. Shoemaker & Son, Fenwick, Mich., a porcelain roller mill, in Gray's noiseless belt frame; Downs & Hefford, Topeka, Kan., a No. 3 four-break reduction machine and other machinery for their mill; Piper, Gibb & Co., Pipersville, Wis., six Allis rolls, in Gray's noiseless belt frames; J. G. Campbell, Kingston, Ont., eight pair Allis rolls, in Gray's noiseless belt frames, and other machinery to fit them out in good shape on the roller system; Sidle, Fletcher, Holmes & Co., Minneapolis, Minn., another Gray's noiseless belt roller mill, with their new first break corrugations; W. Rhodes, Fertile, Ia., a Gray's noiseless belt roller mill; Dewey & Stewart, Owosso, Mich., a Gray's noiseless belt roller mill; R. W. Lewis, Esdaile, Wis., a No. 3 four-break reduction machine and other machinery; Stern & Wolrab, Milwaukee, Wis., a Gray's noiseless belt roller mill; Egypt Milling Co., Ashley, Ill., twelve pair Allis rolls, in Gray's noiseless belt frames, and all necessary machinery to fit them out on the roller system; Theo. Doneho, Medoc, Mo., a Gray's noiseless belt roller mill, bolting chests, etc.; T. & J. W. Andrews, Thornbury, Ont., ten pair Allis rolls in Gray's noiseless belt frames, purifiers, centrifugal reels, etc., in fact a complete outfit to put their mill on the roller system; Indianapolis Hominny Mills, Indianapolis, Ind., five pair Allis rolls, in Gray's noiseless belt frames, for their hominy mills—there are now quite a large number of the Allis rolls used for making hominy, and are giving excellent satisfaction in this line; Stein Bros., Springfield, Kas., a No. 3 four-break reduction machine, Gray's noiseless belt roller mills, purifiers, etc., to make a good roller mill; Turner & Redfearn, Good Thunder, Minn., a Gray's noiseless belt roller mill; Elk City Milling Co., Elk City, Kas., ten pair Allis rolls, in Gray's noiseless belt frames, and complete outfit for a roller mill; Skilleps & Thomas, Kennedy, N. Y., a porcelain roller mill, in Gray's noiseless belt frames; Russell, Miller & Co., Bismarck, D. T., a noiseless belt roller mill; A. Pamburg, Rome, Wis., a Gray's noiseless belt roller mill. The following orders were received from prominent mill furnishers: Through Willford & Northway, Minneapolis, Minn., a Gray's noiseless belt roller mill for J. M. Engleth, Hematite, Mo.; through Richards & Butler, Indianapolis, Ind., eight pair of Allis rolls, in Gray's noiseless belt roller frames, for J. Maphis, Mt. Jackson, Va.; through the Great Western Manufacturing Co., Leavenworth, Kas., seven pair Allis rolls, in Gray's noiseless belt frames, for Messrs. Miller, Bowman & Co., Baker, Kas., and six pair Allis rolls, in Gray's noiseless belt frames, for another job they have under construction; through the George T. Smith, H. P. Co., of Stratford, Can., six pair Allis rolls, in Gray's noiseless belt frames, for T. H. Wyman, Hawksville, Ont.; through the Richmond City Mill Works, Richmond, Ind., eight pair Allis rolls, in Gray's noiseless belt frames, for G. W. Bowen, Independence, Kas., and six pair Allis rolls, in Gray's noiseless belt frames, for Lukins & North, Atchinson, Kas.; through the Capital Iron Works, Topeka, Kas., a Gray's noiseless belt roller mill, for Henry Leichter, Valley, Falls, Kas.; through the Cooke Separator Co., Milwaukee, six pair Allis rolls, in Gray's noiseless belt frames, for one of their customers. Edward P. Allis & Co., of the Reliance Works, Milwaukee, Wis., have recently received the following orders for their justly celebrated engines, and have several more large orders coming in the near future: Bone-steel & Turner, of Springfield, D. T., a 14x36 Reynolds patent automatic out-off engine, complete with boiler, heater, pump, etc.; Milwaukee Industrial Exposition, Milwaukee, Wis., a 12x36 Reynolds' patent automatic out-off engine; Osceola Mining Co., Opegee, Mich., a pair of 20x60 hoisting engines, complete; Henry Glade, Grand Island, Neb., a 14x36 Reynolds-Corliss engine; St. Louis Exposition, St. Louis, Mo., a 22x60 Reynolds-Corliss engine; Dennett Harvester and Machine Works, Milwaukee, Wis., a 14x36 Reynolds-Corliss engine; Pettit, Robinson & Co., Minneapolis, Minn., a 22x60 Reynolds-Corliss engine, complete with steel boilers, Reynolds' feed water heater and purifier, etc.; Washburn Hill Co., Minneapolis, Minn., a 30x60 Reynolds-Corliss engine; J. W. Trowbridge, Wymore, Neb., a 10x30 Reynolds-Corliss engine, complete; Edward P. Allis & Co., are also furnishing a complete steam power for a large elevator at Ft. Williams, owned by the Canadian Pacific Railroad Co., and are putting in a 32x48 Corliss engine, steel boilers, etc.

SAYS A WIT: "Last year I saw a watch spring, a note run, a rope walk, a horse fly, and even the big trees leave. I even saw a plank walk, and a Third Avenue bank run; but the other day I saw a tree box, a cat fish, and a stone fence, I am now prepared to see the Atlantic coast and the Pacific slope."

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

PUBLISHED MONTHLY.

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[Entered at the Post Office at Milwaukee, Wis., as second-class matter.]

MILWAUKEE, NOVEMBER, 1884.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

CAWKER'S AMERICAN FLOUR MILL AND MILL FURNISHERS' DIRECTORY FOR 1884, published by E. Harrison Cawker, of Milwaukee, Wis., and sold for (\$10.00) ten dollars per copy, is now ready for delivery. It shows the result of an immense amount of labor, careful inquiry and studious attention to details. It is without doubt the most accurate trade directory ever published, and will be of untold value to those desiring to reach the milling industry of America.

We glean from this neat volume of 200 pages containing no advertisements, that there are in the United States of America and our neighboring Dominion of Canada 25,500 flouring mills, taking them as they go great and small. The work indicates in about 10,000 instances the kind or kinds of power used by the mills, and the capacity in barrels of flour per day. It further indicates cornmeal, buckwheat, rye-flour and rice mills. It shows that the number of mills in the various states and territories of the United States are as follows: Alabama 453; Arizona 17; Arkansas 348; California 222; Colorado 54; Connecticut 288; Dakota 81; Delaware 98; District of Columbia 5; Florida 66; Georgia 681; Idaho 21; Illinois 1128; Indiana 1089; Indian Territory 14; Iowa 790; Kansas 489; Kentucky 713; Louisiana 61; Maine 28; Maryland 353; Massachusetts 340; Michigan 246; Minnesota 487; Mississippi 386; Missouri 1025; Montana 21; Nebraska 25; Nevada 13; New Hampshire 182; New Jersey 442; New Mexico 32; New York 1902; North Carolina 648; Ohio 1443; Oregon 145; Pennsylvania 3142; Rhode Island 51; South Carolina 274; Tennessee 801; Texas 730; Utah 110; Vermont 247; Virginia 781; Washington Territory 61; West Virginia 447; Wisconsin 777; Wyoming 2.

In the Dominion of Canada we find the record as follows: British Columbia 17; Manitoba 54; New Brunswick 198; Nova Scotia 12; Ontario 1180; Prince Edward's Island 39; Quebec 531. Total 25,500.

Taking the work throughout, and it is highly interesting to all concerned in the trade, and we take pleasure in recommending it.

See Page 8.

A copy of Ropp's Calculator and the UNITED STATES MILLER will be sent to any address for one year for \$1.00.

The New American Dictionary and the UNITED STATES MILLER sent postpaid to any address in America for \$1.60.

DURING the year ending June 30, 1884, bolting cloth, to the value of \$396,153, was imported, free of duty.

IMMIGRANTS arrived in the United States during the year ending June 30, 1884, to the number of 518,592, against 603,322 during the year ending June 30, 1883.

That valuable book "Moore's Universal Assistant and Complete Mechanic" and a copy of the UNITED STATES MILLER for one year will be sent to any address in America for \$2.75. Order now.

THE Milwaukee Chamber of Commerce has reconsidered its resolution to withdraw from the National Board of Trade, and will continue with the National organization.

We learn from the *Richmond (Va.) Mercantile and Manufacturing Journal* that a Mechanic's Institute is soon to be established in that city. It speaks well for the enterprise of the South when they give attention towards such projects. We believe that the Institute will be a success.

THE Northwestern Traffic Association has announced a winter rate on flour and grain, to go into effect Nov. 1. The rate is on a basis of 17½ cents per hundred from St. Paul and Minneapolis to Chicago, an advance of 2½ cents. The rate of 15 cents from points in Wisconsin below St. Paul is unchanged.

CONSIDERING the low price of wheat, the price at which bakers in the United States sell bread, is exorbitant. In Chicago, for instance, a loaf, supposed to weigh about a pound, sells for 7 cents, while a 4 pound loaf sells in London for 12 cents. This is a singular state of affairs, and the only conclusion to be drawn therefrom is, that bakers are making great profits. It is full time that bakers came down in prices. If they do not

do so soon, thousands will rush into the business, and then competition will certainly bring down prices.

THE UNITED STATES IS THE GREATEST MANUFACTURING COUNTRY ON EARTH.

According to Mr. Mulhall, F. S. S., a much-quoted English authority, the United States is the greatest manufacturing country on the globe, the value of its manufactured products in 1880 being, as stated by him, about \$650,000,000 in excess of the value of the products of manufacture of Great Britain during that year. Our census valuation of products of manufacture in 1880 was \$5,369,579,191. Of this amount the value of products consumed in the United States and disposed of in the course of our internal commerce was about \$5,260,000,000.

But the total value of the exports of products of manufacture from Great Britain and Ireland to all foreign countries during 1883 was only \$1,047,000,000, and the total value of the exports of products of manufacture from France was only \$364,000,000. In other words, the census valuation of products of our own manufacture consumed in the United States during the year 1880 was five times the value of the exports of products of manufacture from Great Britain and Ireland during the year 1883, and more than fourteen times the value of the exports of products of manufacture from France during the same year.

The foregoing facts clearly illustrate the enormous magnitude of the internal commerce of the United States.

AMERICAN EXPORT OF BREADSTUFFS.

The value of our export of breadstuffs for the year ending June 30, 1884, was \$162,544,715. Of this, 95.13 per cent. consisted of wheat, wheat-flour, corn and corn-meal. It is estimated by persons well informed in the grain trade that about 93 per cent. of the exports of bread and breadstuffs from the United States consists of products of our western and northern States. The exportation of corn (maize) fluctuates greatly from year to year. Since the year 1869, the annual value of corn exported has ranged from a little more than \$1,000,000 to \$98,000,000.

The export of wheat and wheat-flour during the last ten years have constituted 30.18 per cent. of the total quantity of wheat produced in the country, and the exports of corn and corn-meal have constituted only 4.52 per cent. of the total corn product. The total value of the export of bread and breadstuffs has constituted 26 per cent. of the value of the domestic exports of the country during the last ten years. The following table clearly indicates the enormous growth of the exportation of bread and breadstuffs, especially during the last twenty-four years.

Year ending June 30—	Bread and breadstuffs
1860.....	\$ 24,422,310
1861.....	72,152,366
1862.....	84,183,754
1863.....	89,180,332
1864.....	68,400,606
1865.....	58,941,231
1866.....	41,249,054
1867.....	41,288,804
1868.....	69,024,059
1869.....	53,724,154
1870.....	72,250,938
1871.....	79,981,187
1872.....	84,586,273
1873.....	98,743,151
1874.....	161,198,864
1875.....	111,458,295
1876.....	131,181,555
1877.....	117,806,476
1878.....	181,777,841
1879.....	210,355,528
1880.....	238,086,895
1881.....	270,332,519
1882.....	182,670,622
1883.....	208,040,850
1884.....	162,544,715

INSECTS WHICH INJURE GRAIN IN THE GRANARY.

The grain weevil (*calandra*, or *curculio granarius*). This belongs to the same family of insects as the *curculio*, which destroys plums. In its perfect state it is a slender beetle of a pitchy red color, about an eighth of an inch long. The female deposits her eggs upon the wheat after it is housed, and the young grubs hatched therefrom immediately burrow into the wheat, each individual occupying alone a single grain, the substance of which it devours so as to leave nothing but the hull, and the loss of weight is the only exterior evidence of the mischief that has been done. The adults also eat the grain. In Europe it has proved peculiarly destructive to stored grain. Roasting or kiln-drying the wheat effectually destroys the grub. The grain moth (*tinea granella*). The angoumis moth (*anacampsis ceralia*), is a small moth, resembling the well-known carpet moth of houses, the grubs of which prey on stored grain. There are probably many other insects than the above injurious to wheat at various stages of its growth, but, unfortunately, practical farmers pay little attention to entomology, and are apt to confound not only one known species with another, but also those which are de-

scribed with those which are not. An intelligent farmer would confer a great benefit on the community were he to study carefully the habits of all insects injurious to vegetation in his own locality, and make the results known. Insects injurious to the farmer appear to be increasing in all parts of this country, and it is very essential that their habits should be accurately studied, so that remedies may be devised. It is only by our becoming thoroughly acquainted with the character and peculiarities of our enemies that we can hope to overcome them. Mere guesses and random experiments rarely if ever prove of any benefit. The loss annually sustained by the country in consequence of the depredation of insects is exceedingly great, and is calculated by millions of dollars.

SPECIAL INDUCEMENTS TO SUBSCRIBERS.

If you are not already a subscriber to the UNITED STATES MILLER, now is your time to subscribe. We call your especial attention to our announcement on page 10. It may be summed up as follows:

We will send the UNITED STATES MILLER post-paid to any address in the United States or Canada for one year and a copy of Ropp's Calculator in plain binding for \$1.00, or a No. 3 Calculator and the paper for \$1.50; or a copy of Ogilvie's Popular Reading No. 3 and the paper one year for \$1.00; or the books entitled "The Great Empire City" or "Fifty Complete Stories" and the paper for one year for \$1.00; or the "New American Dictionary" and the paper for one year for \$1.60; or "Moore's Universal Assistant and Complete Mechanic" and the paper one year for \$2.75. Our readers should not fail to take advantage of these offers, which remain open until we announce to the contrary in our columns. All remittances must be made by postoffice money order or registered letter. Remittances made otherwise will be at your own risk.

WHITE BREAD.

A somewhat hackneyed subject this is to be sure, but many brains are so constructed that the only way to get truth into them is by hammering it in with repeated blows. So there are still a number of well-meaning people who are firmly persuaded that white bread, though pleasant to the eyes, is not so nutritious as the loaf of darker hue, which contains a percentage of bran.

The arguments of the "whole-wheat-flour" maniacs are too well known to require repetition, as indeed are also the contra-arguments of those who hold that the universal preference for white bread is justified by scientific facts.

All we want to here mention is a fact which seems to have escaped most of the disputants on both sides of the question. Not only does white bread contain more available, i. e. digestible, nutriment per pound than does its "colored brudder," but the use of the latter actually lessens the nutritive value of the other food taken at the same time.

Think that is rather fishy, do you? Well, it is a fact nevertheless, and this is the explanation of it: Bran is well known to have a marked effect in quickening the peristaltic action—in other words, it lessens the time of the food's passage through the body. The food is therefore removed from the action of the gastric juices before digestion is complete, and thereby its nutritive value is decreased.

The more a sensible man investigates the subject, the more firmly does he become convinced that bran has no business in flour, and that the beautiful white loaf made from roller-flour is by far the best in every respect.—*Roller Mill.*

Translated from the *Allgemeine Mehlzen-Zeitung* for the UNITED STATES MILLER.

THE CONDITION OF THE GRAIN TRADE.

An examination of the grain harvest in the two hemispheres should satisfy everyone that the result in general indicates an average crop, while the principal producers, such as North America and Russia, which determine the prices on the markets of the world, show greater and better yield than in the years immediately preceding. India alone has a deficit worth mentioning, estimated at about 20 per cent., but which, in comparison with the gigantic surplus of nearly 80 million bushels, secured in the United States, hardly can be taken into consideration in the question of export and providing Europe with wheat from across the seas.

The period for growth of grain was not very favorable this year, for after the chilly and rainy weather in the latter spring months, rust appeared in most countries during the critical period of formation of the berry; and, in consequence, everybody prophesied that this year's crop was to be considered as half lost. The contrary has happened. With very few exceptions all countries have secured a quantitatively full average crop; but the quality almost everywhere shows traces of the unfavorable condition of the weather during the formative period, as well as of the troublesome rust. "Abundant and poor" is

a variation of the well-known expression of Reuleaux's: "Cheap and poor," which may be justly applied to this year's grain harvest, and in this circumstance the principal reason must be sought for the enormous tumbling of prices for all kinds of grain albeit the effects of speculation on this phenomenon is not to be underestimated. When the American grain trade offers its wheat to the European consumers at fabulously low prices for delivery at any time, and accepts the cheapest conditions of payment, as has been the case during the last weeks, there must be another factor at work than the large production; there must have existed, on the other side of the Atlantic, a speculation on future options, which finds itself disappointed in its expectations, and is now trying to get rid of its large reserve of wheat at any price, the expected failure of the crop not having occurred.

It is an ever recurring experience that the consumer, in the face of falling prices, discontinues his purchases in the same manner as, at a favorable opportunity, he often supplies his wants for several months in advance. The low prices this year are still harder for the producer, since, after all, the crop is not to be considered very large and quantitatively is much smaller than the one of 1883.

The following table, in which the crops of 1882 and 1884 are contrasted in figures, gives a very clear idea of these facts. It shows the influence of an over speculation, which tries to get rid of the stock on hand. Taking 100 as indicating an average crop, the results in the different countries during the two years is as follows:

	1884	1882	1884	1882
	Wheat	Rye	Barley	
Austria.....	108	111½	99	103
Hungary.....	104	157	98	108
Prussia.....	97	105	96	105
Saxony.....	110	105	95	100
Franconia and Suabia.....	107	120	101	95
Upper and Lower Bavaria.....	105	130	100	145
The Palatinate & Wetterau.....	90	110	85	95
Baden.....	90	100	80	92
Württemberg.....	99	110	89	100
Mecklenburg.....	105	120	110	105
Denmark.....	100	105	105	100
Norway and Sweden.....	105	105	105	102
Italy, South.....	78	110	...	86
" Upper.....	80	135	60	80
" Eastern.....	100
" Central.....	80	110	70	...
Switzerland.....	80	105	60	75
Holland.....	95	105	95	105
France.....	95	100	80	90
Great Britain.....	105	100	...	98
Russia, Esthonia.....	80	145	65	145
" Central.....	100	...	85	...
" Podolia.....	100	115	80	100
" Bessarabia.....	125	130	130	120
" Kerson, Winter wheat.....	100	...	90	...
" Northern.....	90	...	80	...
" Poland.....	115	112	110	95
" Courland.....	100	95	110	95
Roumania, Moldavia.....	125	135	105	90
Wallachia.....	112	130	102	100
Serbia.....	150	160	140	135
Egypt.....	100	110

The anxiety of the consumers strengthens the pressure on the prices tremendously and has, in reality, brought about the present extraordinary conditions in international commerce, which look suspiciously like a crisis and defy all experience. The argument of "over production" cannot stand in the face of crops that do not far exceed an average yield. During the last ten years very much better crops than this year's have repeatedly been harvested in Europe, and, nevertheless, the prices of breadstuffs remained 15 and 20 per cent. higher than to-day. The following comparison of prices of the two years, 1882 and 1883, is all the more drastic if contrasted with the above harvest results, when it appears that with an almost 20 per cent. more abundant harvest in both hemispheres the prices were 20 per cent. higher than at the present time. That was also the basis on which the business operations of the season of 1882-3 were developed.

The prices at the time of the grain market were:

	Wheat	Corn for May-June.
Vienna, 1882.....	9.15	6.00
" 1884.....	7.70	5.87
Berlin, 1883.....	171.50	---
" 1884.....	145.50	---
Paris, 1883.....	26.30	---
" 1884.....	21.10	---
New York, 1882.....	111.00	89.00
" 1884.....	89.50	61.00

The grain market this year does not seem to have the power of exercising any particular influence on the international trade. Speculation and still more the American unloading hold undisputed sway over the markets, and the bona-fide trade kept away from the market, so as to let the violent fluctuations pass by. In addition, there were misgivings on the Vienna grain market representatives of the importing countries, who, otherwise, by their influence regulate the level of prices. This time that influence had to be renounced in favor of American speculation, which is governed by the crisis in the grain business of the United States, and consequently incalculable as to its operations.

DUST COLLECTORS.

It has been but a short time since dust collectors were introduced into flour mills, but once having been tried their great value and efficiency was admitted and since then there has been a continuous demand for these machines. They have been found to be of value not only in flouring mills but in white lead factories, paint and powder mills, etc.

Although several machines have at various times been placed upon the market, the PRINZ DUST COLLECTOR, manufactured by the MILWAUKEE DUST COLLECTOR MFG. CO., of Milwaukee, Wis., has taken the lead and is generally believed to be the best machine for the purpose in the market. Those who have not seen the machines will readily understand their construction and operation by referring to the accompanying illustrations.

The machine is very simple in construction and is therefore not liable to get out of order. It has no dead air chamber which is liable to wear out soon and allow the air to enter, thus destroying the cleaning properties, allowing the cloth to fill up, preventing the escape of air, thus rendering the work of a purifier ineffectual or otherwise preventing a free ventilation. The cloth cleansing mechanism in the PRINZ machine executes its work by a successive jarring of the sections of the cloth (without moving the portion of the cloth thus being cleaned until the jarring ceases) combined with the air which is reversed on that portion of the cloth; the draught comes through the opposite way from which it enters the fan, and by this action the dust is deposited in the collector conveyor, and is discharged by it. The machines, having a great amount of cloth surface, have great capacity. There being no back pressure on the fans but little power is required to drive them. It is desired in mills because it does away entirely with those long spouts leading from purifiers to dust rooms, which give so much trouble by filling up, and it also does away with the cumbersome, dirty dust room with attendant spouts, which occupy so much valuable space.

Which of our milling friends have not heard of dust explosions in flour mills? The desire for a preventive of this liability to sacrifice human life as well as destroy valuable property, has long been felt. Insurance companies only secure losses originating from fire, and in numerous cases where mills have been blown up by dust explosions, without any trace of fire origin, the losses sustained have not been recovered from the insurance companies.

Those interested are well aware of the causes of dust explosions. There have been totally destroyed some of the finest mills in the country, where the explosion originated from fire sparks produced by fast running machinery, and the same coming into contact with air currents, loaded with floating particles of flour dust, in the long spouts leading to the dust rooms, spread the fire with such rapidity over the whole mill, as to render all efforts to extinguish it, useless.

By the use of a dust collector, the floating dust in dust rooms and attendant spouts is done away with. The dust being collected as soon as it reaches the machine, and the air discharged dustless, the danger of dust explosions is overcome. The importance of the dust collector is fully recognized by the leading insurance companies, who are assuming larger risks at smaller premiums on those mills using dust collectors.

The health of the miller, which is promoted by a pure and dustless atmosphere, together with the comfort of a clean mill, are matters certainly worthy of some consideration, not to speak of the large amount of material that is actually being saved by the use of the machine.

In order that the dust collector should work to the best advantage it is necessary that the connections with various machines should be properly made. In order to show this plainly the Milwaukee Dust Collector Mfg. Co., have recently published "A Treatise on Dust Collection," with many illustrations showing the method of connecting with various machines.

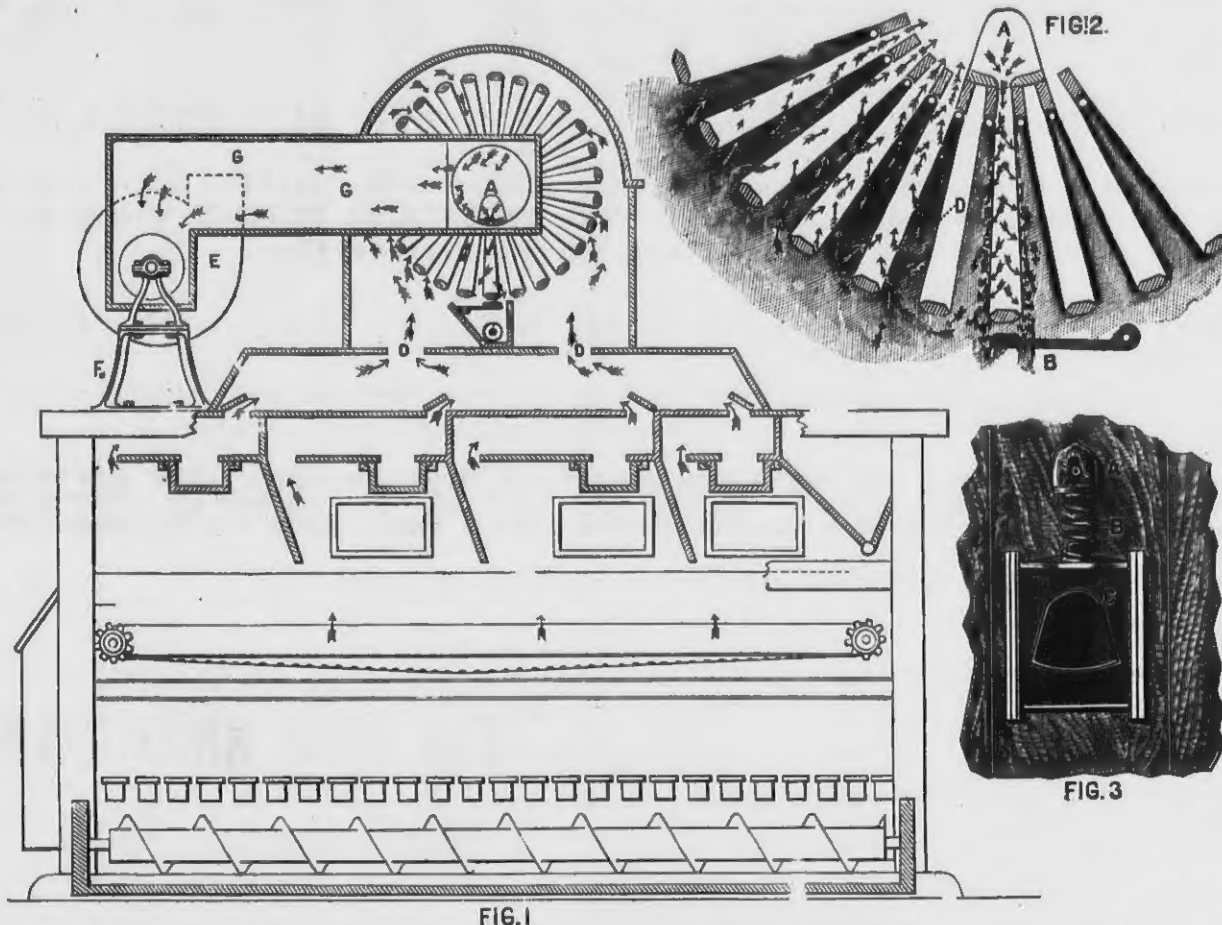
We present herewith illustrations showing method of connection with the Geo. T. Smith middlings purifier. The dust collector is placed on top of the purifier and connections made with the purifier fan. Figs. 1, 2 and 3, represent a sectional view of the connection and Fig. 4, the Smith purifier with dust collector attached. In Fig. 4, A indicates the

air-box on the dust collector, of which there is also one on opposite side of that shown; B, B, B, air-spout connecting dust collector with purifier fan; C, indicates purifier fan; E, E, indicates stands for raising purifier fan journals. Figs. 1, 2 and 3, represent a sectional view of Fig. 4. It also exhibits a section of the balloon in dust collector (Fig. 2), showing the cleaning mechanism, namely: knocking device, and introduction of "back-draught" current, and Fig. 3, shows the adjustable device for "back-draught" tube, which will be fully explained hereafter.

Fig. 1, letter "A" shows centre of balloon where the draught is applied drawing the

Fig. 2, shows adjusting device of "back-draught" tube, which must always be held closely in its seat in order to avoid a waste of the "back-draught" current. "A" shows the adjusting device pressing on the spring which keeps the tube snug down on section of balloon. "B" represents spring. "C" represents "back-draught" tube, which being loose and sliding is kept down on section of balloon that is being cleaned, as above stated.

The manner of making connection with many other machines is clearly illustrated and described in the *Treatise on Dust Collection* issued by the Milwaukee Dust Collector Mfg. Co., a copy of which can be obtained



FIGS. 1, 2, 3—SECTIONAL VIEW OF DUST COLLECTOR IN CONNECTION WITH SMITH PURIFIER.

dust laden air into dust collector and here by those interested by addressing the Company. The "back draught" is introduced through "back draught" tube, down into sections of balloon. Letter "B" shows knocking device underneath the balloon. Letter "C" represents the conveyor, into which the dust is being dropped, and by which it is carried off. Letters "G, G," show air spout connections with purifier fan. "E" indicates purifier fan. Letter "F" shows stands for raising fan

A NEW ENGINE OF DESTRUCTION.

On Delamater's large derrick, at the foot of West Thirteenth street, there rested yesterday a nondescript-looking craft, which attracted much attention. This was the submarine Monitor, which has been constructed for Prof. J. H. L. Tuck, at the Delamater

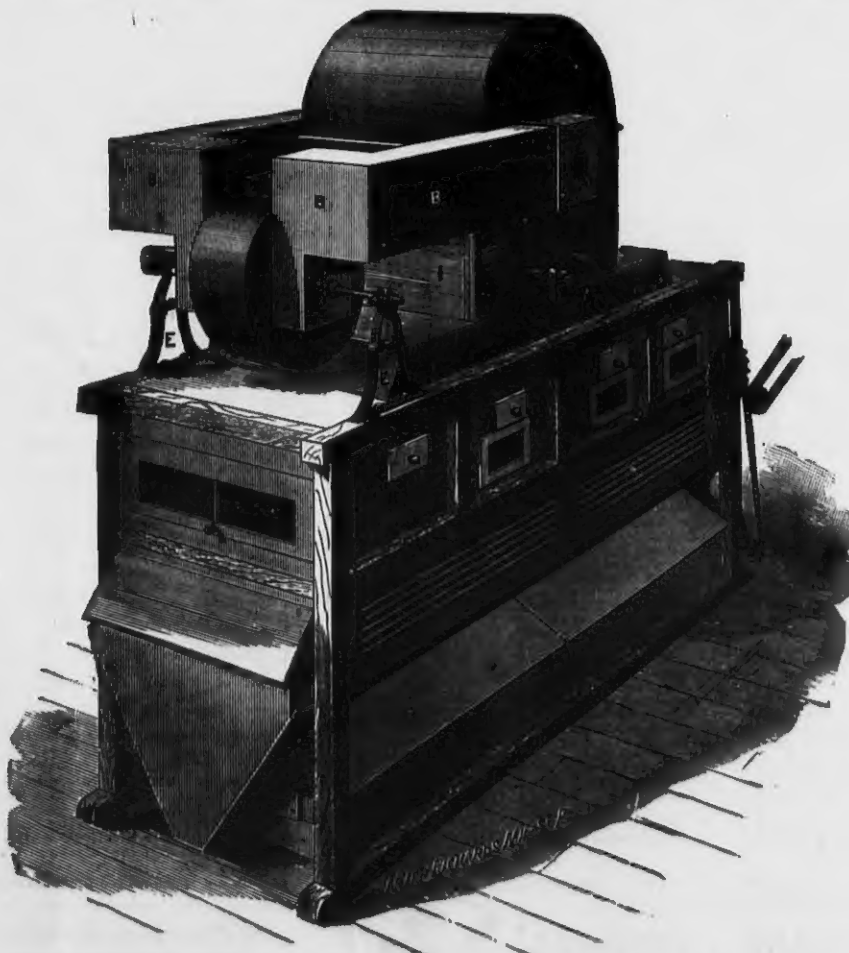


FIG. 4—DUST COLLECTOR IN CONNECTION WITH SMITH PURIFIER. (FULL VIEW).

journals. "D, D," shows openings through purifier deck into dust collector, allowing the air to pass freely to both sides of the balloon, which should be placed as near the ends of dust collector as possible.

Fig. 2, shows section of balloon, in which letter "A" shows where the "back draught" current is introduced through the "back-draught" tube into the section that is being cleaned. Letter "B" shows knocking device. Letter "C" shows outer surface of cloth to which the dust adheres. "D" shows the inner surface which is the clean side, and on which side the "back-draught" current is forced.

Works, and which has only recently been completed. A partial trial of the boat has been had in the North river, off the foot of Eighty-fourth street, and the craft has been taken out of the water to receive her final coat of paint and to receive some trifling alterations to her machinery.

When all complete, the professor intends to give a public exhibition of her ability as a destroyer by blowing up some old hulk or canal-boat in the harbor. The Delamater company, it will be remembered, constructed some years ago the celebrated submarine boat which, under the impression that she was a Fenian ram, attracted so much attention.

The present boat, although somewhat similar in shape to that, and in the appliances for moving up and down at will, differs in the matter of propulsion, being moved by an electric motor. She also differs from that boat in the fact that means are provided by which those inside of her can come upon the outside and conduct their operations while the boat is beneath the surface of the water. That boat also was a ram; the present one is a torpedo-boat, pure and simple, and has the means of attaching her torpedoes to the vessel to be destroyed, and then moving off at a safe distance and exploding them. She is built of steel, is thirty feet in length, seven feet six inches in beam, and six feet deep. At the stern is a small propeller and a rudder of the ordinary shape, and on either quarter are fans by which her course is directed up or down.

In the center of the deck is a well covered with an air-tight hatch, and the sides of the well has an air-tight door communicating with the inside of the boat. When the captain desires to go on deck, he puts on a sub-marine armor and steps into the well, and, having closed the door, he connects an air-tube with his helmet. The tube is connected with an air-pump in the boat. He then opens a water-cock and allows the well to fill with water, thus equalizing the pressure above and below the hatch, which can then be opened, and then standing on a shelf in the well, he has his head and shoulders above the deck, and can have the free use of his hands and can also see in all directions. The steering gear is at hand as is also the gearing to the quarter fans, and so may move at will, up or down, forward or back. In the hold of the boat are storage batteries, about 15x20 inches in size, packed on both

sides as close as possible. The machinery is an ordinary dynamo, consisting of a cylinder revolving between the poles of a magnet, and to this cylinder the propeller shaft is geared. The tillers are further aft, and there is a seat for the helmsman, just above which is an indicator, which shows the exact distance that the boat is beneath the surface.

The compressed air is stored in six-inch pipes, running around the inside of the boat, and there is an arrangement by which a couple of rubber tubes can be sent to the surface from a depth of twenty feet, and by this means a fresh supply of air may be obtained. The professor also proposes to use chemicals to revivify the air. The boat has a displacement of twenty tons, and is fitted with compartments so that water can be used for a regulating ballast. Force-pumps are attached to these, and they may be filled or emptied at will. The interior is lighted by an electric lamp. She is to have a torpedo at each end, fastened to the deck by a detaching apparatus. They are to be connected by a chain, and to have an electric wire attached to each. They are fitted with cork floats, which cause them to rise as soon as detached from the deck, and over the corks are powerful magnets, which will cause them to adhere to the bilges of the ship to be destroyed. The boat is then steamed off to a safe distance, and there an electric spark sent through the wire explodes the torpedo. The boat will, it is calculated, go at the rate of about eight miles an hour.—*New York World*.

THE trouble with these business partnerships in which one man puts his money in against the experience of the other man is that the moneyed man usually makes his individuality too largely felt in matters both great and small. If, however, he is naturally a smart, bright fellow, the business of the firm may prosper uninterruptedly, but, if, as is frequently the case, he is simply a pig-headed autocrat, things are likely to go to the dogs.

An illustration of how the inexperienced capitalist in a jug-handled firm can hurt the firm's business was furnished by a recent boiler explosion in a large neighboring town. The practical partner in the firm, and who, by the way, was the engineer, explained to his monied associate in the presence of a St. Louis boiler maker, that the boiler was unsafe, and ought to be displaced. This, too, was the emphatic opinion of the St. Louis man. The monied partner, however, thought he knew more about boilers than either the engineer or the visitor, and refused to give the order. In three or four days afterward the boiler blew up, wrecking the greater part of the mill.—*Quidnunc in the Age of Steel*.

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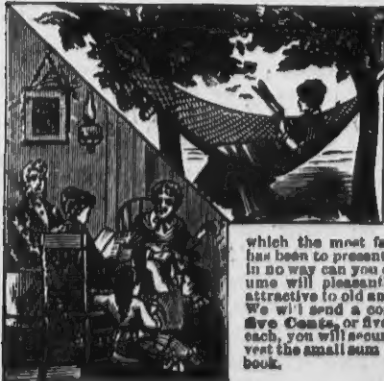
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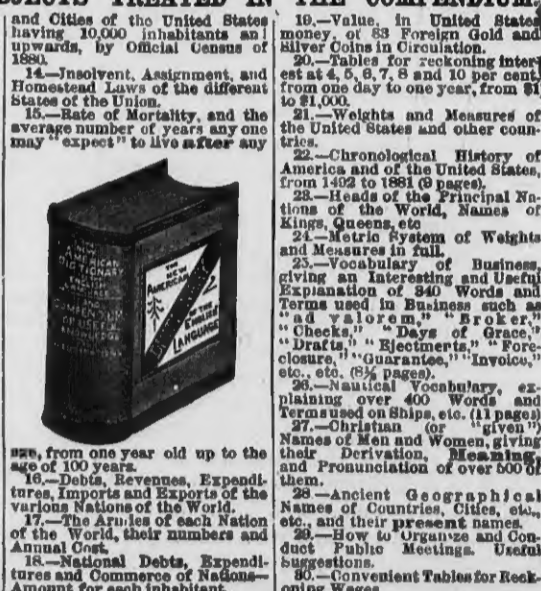
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A MILL MAN'S THRILLING ADVENTURE.

IN BED WITH A RATTLESNAKE.

An old man and a young one met in an up-town museum the other day and found mutual interest in discussing a cage of snakes. "If you would care to hear it," said the old man; who was old only in years, his sturdy form indicating that not more than three-quarters of his life was behind him. "If you would care to hear it I will tell you a story about a snake, not one of these foreign reptiles, but a home-bred rattlesnake, too common, I suppose, to find a place here."

"Tell it," said the young man. "Snake stories are always interesting." And so it came about that 15 minutes later the two sat at a table in a quiet corner of a quiet restaurant, and the old man thus began:

"My name is Thomas Wilman, and I live in Philadelphia, where my son Harry is a prominent business-man. Thirty-one years ago yesterday I married, in Great Barrington, Mass., as pretty a girl as that village (famous for its pretty girls) ever sheltered. She had been well brought up, but had no fortune. I had \$1,500 which I had made by running a saw-mill. We were young and had the world before us, and we concluded to go West. Going West in those days didn't mean, as it seems to now, going beyond the Mississippi. Going into 'York State' was going West then. I had a cousin in Cattaraugus, a little village on the Erie Railway, 30 miles east of Dunkirk, and we concluded to go there.

"It was late in August when we reached Cattaraugus. My cousin gave us a hearty welcome, and I set about looking for a spot to build. Cattaraugus is a curious sort of a place. The village is surrounded by hills, and the wonder to me is that it doesn't slide down into the washbowl-like valley on the side of which it is built. A little creek runs through the village, and a mile to the west finds itself in a deep, narrow valley, with almost perpendicular sides, 100 feet high. This valley is called Skinner Hollow, and is one of the most picturesque spots on the Erie Road. I went down into the hollow prospecting. The sides, where they were not too steep, were covered with a heavy growth of first-class pine, and for miles around the hills were thick with the same timber. I saw there was money in a saw-mill right down in that hollow, and I built one on the stream, which I could see was a good sized creek most of the year. It is one of the branches of the Cattaraugus Creek, which empties into Lake Erie 30 miles west of Buffalo.

"I built my mill there and close to it a little house, so close, in fact, that the two joined. I took Katie, that is my wife, down there and we began house-keeping. That was well into winter, and I began logging at once. I hired a gang of men to help me, raised money by contracting my lumber ahead, and started in. We cut logs on the hill close to the mill, rigged up slides, and ran them down to the logway. I tell you it was music to me when the saw ripped into the first log and a clean-cut slab dropped away from the teeth. We had a little jollification. That was the first log ever cut in Skinner Hollow, and people drove miles to see it. Business was good. There was lots of snow, which made it easy work getting logs to the mill and drawing the lumber out to the village, besides giving me all the water I wanted. In fact water was running over the tail of my flume every hour from the time I turned it into the race till the middle of July. Then a dry spell came on, and I had to shut down for two or three hours every day to let my race fill up.

"But I didn't mind that. I had had a tip-top season and had made money. I had logs enough at my door to keep me busy for a year, and I knew where there were plenty more when those ran out. And, besides, I had two to look after instead of one. You wouldn't think if you'd see Harry, with all his refined ways and education, that the first music he ever heard was a saw tearing through a pine knot. But it's so. He was a pioneer's son, and knocked around a saw-mill till he was into his teens. Well, when business was slow I worked around the house, fixed up things here and there for Katie, so as to make her more comfortable. She couldn't have been more contented. She used to think that saw-mill was just about the pleasantest place in the country. Hour after hour she'd stay out there with me, and we'd keep up the conversation while the log was running back and stop when it went up to the saw. Dear me! Dear me! Why I can see her just as she used to look in those days in that little saw-mill just as plainly as if I stood there with her to-day. She used to jump on the log and ride up pretty close to the saw, and then, just as I would get scared and jump to drag her away, off she'd go. Nobody was ever happier than we were, and we have never been as happy since, though we've been pretty happy and are yet."

The yellow sunlight flickered into the room where the two sat, and the wine looked like blood as the dancing rays shone through it. The old man was lost in happy reverie, and the young man ventured to remind him that there was a snake story promised.

"True," said the old man, starting. "I'm just coming to that. I lost myself thinking of those old days. There was snakes then, and we had killed them. Rattles used to come out on the ledges of rocks and lay in the hot sun. One or two had come around the mill, and I had shot one in our door yard. But we thought nothing of that. People living in the woods or in wild places got used to things that would fill them with horror in a settled country. We expected to find snakes, and as long as they kept their distance, or gave us a chance to shoot them when they got too near, we didn't mind them.

"As I told you, I fixed up things around the house during slack time. One of the bits of furniture I knocked together was a bedstead. It was more like a broad lounge than a bedstead, for it had neither head nor footboard. One end was a little like a couch, and that was the head. We had some bearskins and blankets to sleep on, and more blankets to cover us. It was a big improvement on the floor where we had been sleeping, and after a hard day's work handling logs, I used to think it about as comfortable a spot as I knew.

"Well, it got along into the fall and we began to have chilly nights. The equinoctial gave us a big rain, and for a fortnight I had all the water I could use. Then it got dry again. One afternoon, after several days of threatening weather, it began to rain. Hour after hour the rain came down till about 9 o'clock in the evening, when it suddenly cleared off and turned cold. It was late in October, and we kept a fire burning on the hearth nights, more for the baby's sake than for our own. Our bed was parallel with the fireplace, and stood out near the middle of the room. We had an English shepherd dog named Leo, which we took with us from Massachusetts. He was a black-and-white beauty, and my wife, who raised him, thought about as much of him as she did of the baby or me—at least I used to tell her so. The dog was fond of me, and I made a great pet of him. He was a noble fellow, and all he wanted was for me to whistle just once and he'd come. We let him sleep in the room at the foot of the bed. Sometimes in the morning I'd wake up before my wife, and I'd whistle just once to the dog. Up he'd come over the foot of the bed, and he'd wake Katie by licking her face.

"That night we were just going to bed when it turned cold. I threw an extra pine knot on the fire and went to the door and looked out. I shall never forget that look, for it was the last time I ever stood there and saw stars above Skinner Hollow. I closed the door and went to bed and soon fell asleep. I slept on the side of the bed nearest the hearth, and my wife slept on the further side, and the baby lay between us. For some reason I didn't sleep long, and when I waked up I couldn't get to sleep again. Finally I got out of bed and threw another knot on the fire. Leo was stretched out on the floor with his nose between his paws. He eyed me sleepily as I walked around the room and gave me a loving look as I stooped down and patted his head. I went back to bed and fell into an uneasy sleep. All at once I awakened with a start. It must have been past midnight. I seemed to be fully awake the moment I opened my eyes, and such a sight as they rested on God grant they may never see again. I was lying on my left side facing my wife, who was lying on her right side. The baby lay on its back between us. As I opened my eyes a dark object glided down from off the baby, and just then the knot burst into flames and flooded the room with light. A rattlesnake fully five feet long, had slipped down from between my wife and myself, where it had been stretched out presumably to get warm, and, startled no doubt by some movement I had made in waking, had thrown itself into a coil on the bed at the baby's feet just opposite my knees.

"Somebody asks if life is worth living. I think it is as a general thing, but if life had many such moments as that, I should say emphatically that death was preferable. For a moment I lost my head. I did not move, fortunately, but I seemed to drift entirely out of all consciousness. For a moment only this lasted. Then my senses came back to me, and I felt that from the reaction I would probably tremble from head to foot. How I ever managed to keep my body rigid I don't know, but by an awful effort I did. I knew that to stir was death, perhaps for myself, perhaps for my boy, perhaps—my God, the thought was agony—for my wife. Outside I could hear the eaves dripping from the rain, I could detect the sound of water running to waste over the flume. To-morrow, I thought I'll have plenty of water again. To-morrow! Would I ever see to-morrow again?

And if I did, would I not meet it alone. In spite of all I could do a shudder ran through my body.

"The snake felt it and raised its head. I could see its eyes glisten and dance in the firelight, and the bright rays glanced over the undulating coils. I could see that the snake was irritated, and I knew that it was liable to spring at any moment. Who would it strike? Either of us was within easy distance. It seemed to me that I could see the beginning of the muscular contraction which would precede the spring.

"All this, of course, passed in a fraction of the time I have occupied in telling it. My wife and boy slept on. I prayed that they might not move, for if they did I felt the snake would throw itself forward. I moved my head slightly. The snake's head again arose, and for the first time it sounded its rattle. Instantly my wife opened her eyes, and some way they rested on the snake. I could see that every vestige of color had left her face, but she did not move a muscle. Then her eyes slowly left the snake and came up to mine.

"Looking back over the nearly 30 years which have elapsed since then, I can see the look in her eyes yet. We had sometimes talked about meeting death together. Now it lay between us and in more terrible form than we had ever dreamed of. Yet the look of perfect confidence in me which my wife's eyes almost spoke, was something a man does not see more than once in a lifetime. That look seemed to say, for baby's sake, and like a flash I became as cool as I am this moment. I could not speak, but my wife understood that she must keep perfectly quiet and jump. When the time came, slowly and with infinite care I raised my head till I could look down the bed to the floor beyond. My wife's eyes followed mine, and we both saw the dog. The hideous head of the snake swayed to and fro, and I knew that what was done must be done quickly. I looked at my wife, and she realized my plan. Her eyes filled with tears but gave consent. With a prayer for help I moistened my lips and gave one short, sharp whistle. The snake, I think, didn't know what to make of it, but the dog, Leo, did. As quick almost as thought he sprang to his feet and bounded on the bed. To this day I have never been able to understand why the snake did not strike when the dog moved, but it did not. As the dog's body rose in the air, my wife caught hold of the baby's garments and rolled out of bed. I rolled out on my side, grasped my rifle, which stood at the head of the bed, and turned. The dog and the snake were rolling together on the bed. I caught sight of the snake's head and fire, and the reptile was past doing harm. The dog staggered off the bed to the floor, shivered, moaned once or twice, looked from my wife to myself with more love than I ever saw before or since in any animal's eyes, and died.

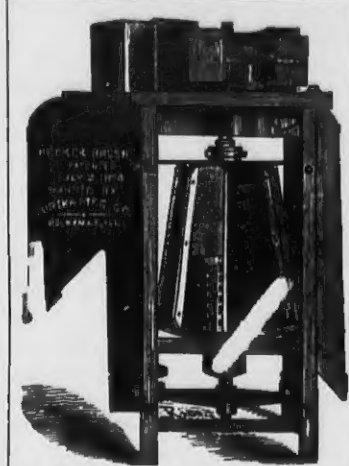
At daybreak the next morning we buried the dog and started for the village. I sold my mill and house to a man who was visiting my cousin, and before sunset we were on our way to Massachusetts. I built another mill in the East, and we prospered and grew rich. Other children came to make our home happy, and there are grand children now. But I tell you, young man, that if poverty stood on one hand and even a glimpse of Skinner Hollow on the other, we would take poverty cheerfully and think we had made a good bargain.—*New York Times.*

MR. M. J. FERENS' NEW MILL AT BISHOP AUCKLAND, NEW ZEALAND.

When the country was really overflowing with foreign flour made on a system superior to that adopted in our mills, our millers saw clearly that if they were to keep the foreign competition out of the country they must improve their style of manufacture. Amongst the millers who have taken this step is Mr. M. J. Ferens, Gaunless Flour Mills, Bishop Auckland, whose mill recently has been converted into an establishment working on the so-called "New Process." Having examined the different new systems Mr. Ferens entrusted the alteration of his mill to the firm of Messrs. Seck Bros., Bockenheim, Germany, a firm well-known for their milling machinery, and who have constructed the only three mills in Stockton working on the roller system. Mr. Ferens' mill contains the latest improvements, nothing being spared to make its results equal to those obtained in the famous Hungarian mills. The system adopted is the so-called "Gradual Roller System," by which the wheat is converted into flour, not by squeezing the flour out of the berry between stones, but by gradually breaking the wheat between rollers into the smallest possible pieces. By this process there are no impurities ground into the flour as with stones, there is no danger of heating the flour as between the stone and through a continual purifying and sifting process the produce is of a whiteness which qualifies the adoption of the

brand of "Snow Flake." Beginning with the first apparatus which we meet on a visit through the mill we find a very ingenious contrivance for mixing several different sorts of wheat without the least manual labor. By changing the position of a few slides a mixture can be made of six different kinds of wheat, and that in any percentage of each which is required. The wheat being mixed passes then a series of screening machines (part of which are an addition to the existing ones), by which the wheat, being subjected to a continual action of rubbing, brushing, sifting, etc., is entirely freed from any impurities likely to injure the results. The process of grinding is done entirely by rollers taking the place of stones, which have entirely disappeared. There are seventeen sets of rolls in the mill. The rolls are of Seck's chilled iron, each pair forming the passage for a separate stream of material. The rolls, which are arranged on the so-called "horizontal type," are partly fluted and partly smooth. The process consists of two main parts, the one to break the wheat into smaller particles, called semolina and middlings, the other to reduce the middlings and semolina into flour. For the first process grooved rolls 19 inches in length and 9 inches in diameter are used, six pairs of rolls being adopted; for the latter (the reducing process) we find quite a number of smooth rolls of the same size. Following up the way which the wheat takes in the first (the break) process, we find it passing six times between grooved rolls with a sifting machine covered with wire after each pair of rolls. The results from this break process consist of a small percentage of flour, a large percentage of middlings and semolina, and finished bran. This bran produced on rolls is not so much cut up as the bran produced on stones, and is quite clean, all particles of flour being scraped off. The middlings and semolina from the break process pass now a number of machines called "middlings purifiers," consisting of a combination of sieves and exhaust fans, by which all impurities mixed with the middlings, and which consist chiefly of small particles of the skin of the wheat, are drawn away and prepare the middlings and semolina, which form the real kernel of the wheat, for their conversion into flour. In Mr. Ferens' mill we find eight of these middlings purifiers. The middlings and semolina go then on to smooth chilled iron rolls passing them six times, with another dressing and sifting machine after each passage. The sifting machines, called "centrifugal flour dressing machines," consist of a slowly revolving cylinder covered with silk, through the meshes of which the flour is thrown by a number of beaters inside the cylinder, revolving at a speed of about 180 revolutions per minute, and which, by causing a current of air, prevents the impurities mixed with the rolled middlings from passing the meshes of the silk and spoiling the flour. This process of rolling and sifting is repeated six times. As a matter of safety we find another rolling machine put up, which all finished flour must pass before it is taken off in sacks and ready for sale. Comparing this new system with the old stone system, and considering that a grain of wheat has to be brought mechanically about thirteen times up and down through the whole building, the new system at first may look rather complicated. But when watching the way the wheat takes a little closer, we find the whole process the most simple thing. There is not the least manual labor about the mill, except in taking the finished produce off in sacks, and the wheat is not touched after being taken from the roller into the grain hopper until it is converted into a product ready for sale. The system introduced into Mr. Ferens' mill is based on the same principle as that by which the famous Hungarian flour is produced, the firm of Seck Bros., having introduced their system into numerous continental mills. The whole establishment and its results speak highly for the enterprising spirit of its proprietor (Mr. Ferens) and the engineering firm of Seck, and is a further step in the direction of keeping foreign flour out of our country and providing our markets with home-made produce.—*Auckland Times and Herald.*

The great drainage scheme now being prosecuted in Florida by the Disston Company is making great progress, says an exchange. The inconveniences connected with the work have been many and hard to overcome, but now the dredge-boat assigned to the Caloosahatchie portion of the work is doing better and more effective work than ever before. The first cut through from Fort Thompson to Okeechobee, making a canal almost on an air line 22 feet wide and 5 feet deep, has been completed, and the dredge-boat is engaged in making a second cut, having a beautiful canal in her wake 40 feet wide, which cut is expected to be completed early in 1885. This 40-foot canal will make a heavy draw on the waters of the lakes and marshes of the upper Caloosahatchie valley; so much so, it is claimed, that no overflow of long duration need ever be anticipated.



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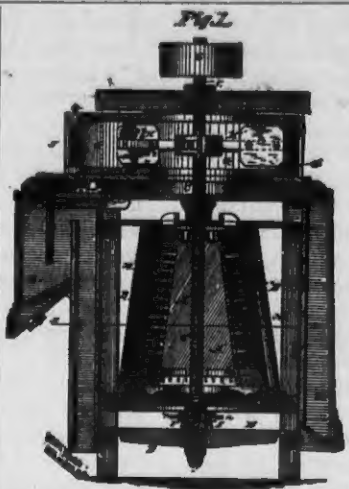
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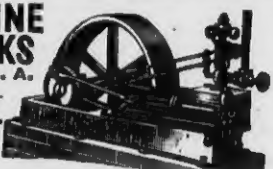
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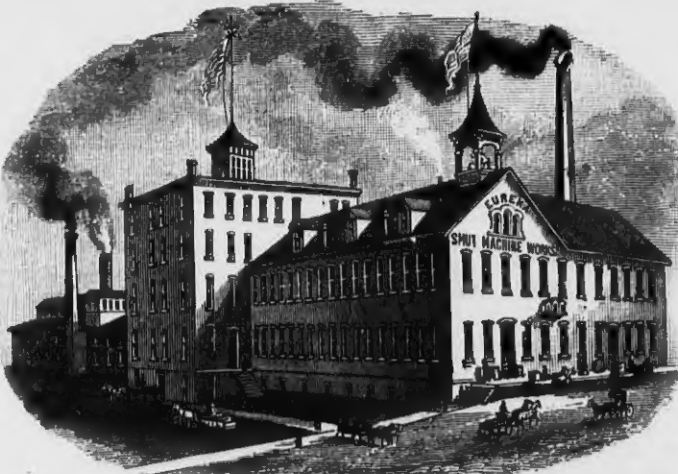
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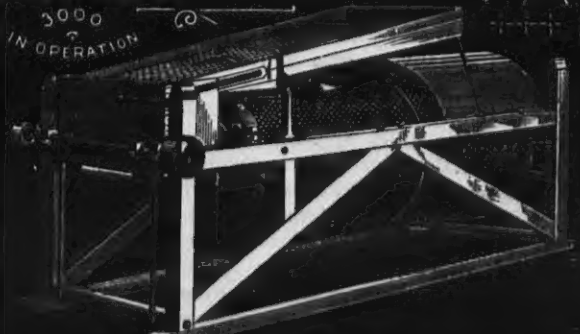
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READ TESTIMONIAL.

Will Grow Poor in the Harvest.

ELKHART FLOURING MILLS, Elkhart, Iowa, March 12, 1884. COCKLE SEPARATOR MFG. CO., Milwaukee, Wis. (Testimonial:—I am in favor of the 5th at hand and noted. We bought one No. 2 machine of you, we think in 1877; it has always done its work satisfactorily and continues to do so. We have not laid out one cent for repairs. If you make all your machines to last as well as ours, you will grow poor in the business. Yours truly, W. SCHMIDT & BRO.

Items From Our German, Austrian and French Exchanges, Translated and Condensed for the Entertainment of the Readers of "The United States Miller."

THE PATENT UNION.

On the fourth day of July last the international union for the protection of property in inventions started into life, composed of the following states, viz.: Belgium, England, France, Holland, Italy, Portugal, Switzerland, Servia, Spain, Brazil, Guatemala, Salvador and Tunis. It will be noticed, that among the several nations, prominent by reason of their industrial progress, still missing from this list, is the United States. The advantages to be derived from a membership in the Patent Union, particularly to young industries, are numerous and apparent. One of the principal of these is that it is sufficient for a citizen in one of the states of the union to make application for a patent in his own country in order to secure the priority in all the other countries during a period of six months. Considering that obtaining patent in ten of the industrially most important countries requires an outlay of about \$900, it is easy to understand the benefit accruing to the applicant from having six months in which to meet this expense. Another incidental advantage is that a citizen of a state participating in the union, who secures a French patent is entitled to manufacture his wares anywhere and import them into France without thereby forfeiting his patent, as heretofore. An American inventor, on the contrary, who desires to protect his industry in France is obliged to let his invention become common property after two years, or to erect factories for its manufacture in France, which alternative frequently offers insuperable difficulties. In consideration of all this it is to be hoped that the government of the United States may be induced to make speedy arrangements to become a member of the International Patent Union.

SUBSTITUTE FOR MILL-STONES.

The old fashioned mill-stone is being replaced by a substitute that answers all the requirements and in form is identical with mill-stones. Such a mill plate is made of several hardened steel plates, and is said to work in a really surprising manner. The work of a pair of mill-stones 50 cwt. in weight may be as successfully executed, both as to quality and quantity, by a pair of such plates that only weigh 4 cwt., and it is evident that a runner weighing 25 cwt. and making 120 revolutions in a minute must require a very much greater driving power than a mill-plate weighing less than 50 pounds. The durability is claimed to be greater than stones, while the cost is only a tenth part of the price of the latter. These mill-plates, called Victoria Mills, are put on the market by H. Jung in Eisenach, Germany.

AGRICULTURAL CONDITION OF FRANCE.

By reason of the existing laws of inheritance in France, the division of the ground into minute subdivisions is going on more rapidly than ever. The number of farms that are unable to maintain cattle, is daily growing larger. On the other hand, the wages of farm laborers has for years been relatively too high, and as there is no prospect of their being lowered, the result is that France can no longer produce as much grain and meat as is needed for home consumption. Being thus compelled to import from foreign countries and affected by the general decline in prices in the markets of the world, agricultural pursuits in France are daily getting less remunerative, and in many cases, particularly when the ground is mortgaged, the ownership of a farm leads to financial ruin. While, for instance, a quarter of wheat must bring 25 francs in order to pay for raising it, the price vacillates between 19 and 23 francs, and the rents of real estate are falling more and more, so that they now frequently are only from a fourth to one-half of what they were in the years between 1865 and 1875. These evils, according to the *Austro-Hungarian Miller*, can only be obviated by the formation of associations among the farmers for common purchase and use of machinery, erecting dairies and cheese factories, dealing in fruits, manufacturing sugar, etc.; furthermore, by lowering railway freights on native natural products in internal commerce and for export, by regulating by laws the agrarian credit, and, generally, by instruction in better farming methods and the manner of driving up the laboring power to its highest pitch. In order to relieve the financial distress of the agricultural population, the French government has decided on an increase of import duty on foreign cattle and reorganization of charges on ships.

THE CROPS OF THE WORLD.

The well-known yearly publication of *Edmonne*, which contains a review of the result

of the harvest in all grain producing countries of the world, according to latest available reports, has just been issued in Paris. The following is a summary of its statements:

In the United States the crop is above the average, and the quantity is better than in the spring. Oats, rye and barley are also of good quality, and, as to quantity, an average yield of these grains is assured. The corn crop, which is very late this year, is estimated at 1,800,000,000 bushels; the wheat crop is officially calculated at 480,000,000 bushels, and on the New York produce exchange, at 500,000,000 to 525,000,000 bushels.

India has this year had an abundant wheat crop, which will yield an excess over home use of nearly fifteen million centnerweights of 100 kilograms for export.

In England the wheat crop is announced to be above the average for ten years, and is estimated at 11,500,000 to 12,000,000 quarters. The other kinds of grain are held as an average crop.

As to Germany, a larger yield is expected than in the spring, and the importation will be smaller than during 1883.

From the lower Danubian countries the report is very favorable, and the result in the principal kinds of grain is almost above the average. Roumania and Servia are capable of exporting.

Switzerland has a crop which indicates the need of the same import as in former years. Spain, after several poor years, has at last obtained an average crop.

Holland and Belgium will import no more than in the springs.

In France, reports from 88 departments are on hand. The crop in 34 is very good, in 22 tolerably good, in 15, medium, and in 17 poor. Of barley, it has a small crop, and of corn an insufficient one. The wheat, apparently being an average crop, France will be obliged to import about 15,000,000 to 20,000,000 hectolitres. (2.83 bushels.)

In Russia, the crop is reported as closely approaching the average, and the aggregate amount available for export may be put down at 85,000,000 tchetverts. (5.95 bushels each.)

Austria-Hungary has a good crop, but its quality is not all that could be desired. The surplus for export will be about the same as from the harvest of 1882.

At the end of the work will be found a tabular view of wheat importation of different countries during the last ten years. The total yearly import in England was 24,000,000, cwt of 100 kilograms, France, 11,000,000; Belgium, 3,000,000; Switzerland, 2,500,000; Italy, 2,500,000; Holland, 1,500,000.

PLEASANT PARAGRAPHS.

SHUT AS CLEAR AS MUD.—"I explain it all to you," said one of the partners in a furniture house in Western Michigan, which had its paper protested. "You see I and my brodder Shake vhas bartners. We each draw \$20 per week and we haf money left to bay all our debts and keep up our stock. Shake he go oafar to Chicago, and eafery body asks him if we make some difdends and how mooch. When he comes home he says we doan' shtand oop mit odder houses if we doan' make some difdends. Dot look all right to me. We haf two thousand dollar laid away, and I take half und Shake half. When some drafts come Shake doan' like to bay, and I feels shust dot vhay, too. If you haf some difdends, dot vhas all clear for you, und you doan' put him back in der firm. It vas a leedle mixed oop, und I guess we like to sell out."

"So you think John is becoming a great man in the city?" said a farmer, speaking of his absent son, to a companion of the youth.

"Great man! I should say so. Why, there ain't a bar-keeper in the city, hardly, that he don't call by his first name."

A CHICAGO girl on a visit to New York threw her slippers at a cat last night, and the telegraph has since been deluging the country with the frightful accounts of an earthquake.

"TALK about your gallant police force," sneered a stranger to Fitzgoober. "I ran one of them nearly to death last night."

"What for?" asked Fitz.

"Because," answered the visitor, "I didn't care to be arrested in a strange town."

"Oh, I see, now; you were in front of him!"

"Of course I was. What d'ye suppose I wanted to get behind him for?"

HOUSE RAISING.—"Chicago is a great city," remarked one traveling man to another, as they got off the train in that town.

"Yes, it's a big place. Did you ever see them raising houses and building the first story last?"

"No; do they do that?"

"Yes, all the time. Why, some time ago they raised the whole Tremont House, with four thousand jacks."

"How many?"

"Four thousand?"

"Thunder! It didn't take that many, did it? By gravy, I saw a fellow down in Cincin-

TECHNICAL VOCABULARY OF THE PRINCIPAL TERMS AND WORDS USED IN MILLING.

With equivalent words in English, French, German, Spanish and Italian.

(From the *Journal de la Meunerie*, and other sources.)

ENGLISH.	FRENCH.	GERMAN.	SPANISH.	ITALIAN.
Hopper	Boisseau	Behälter	Cajo	Cassone
Receptacle holding the feed of different machines, or holding the different finished or unfinished products of a mill, like wheat, flour, offal, etc.				
Brush	Brosse	Die Buerste	Cepilladora	Spazzolatrice
Apparatus used for removing the dust adhering to wheat, or for removing the flour particles which adhere to the bran.				
Wheat Brush	Brosse à Blé	Die Getreidebuerste	Cepilladora de Trigo	Spazzola da Grano
Machine for cleaning wheat, &c., to remove the dust, the beard, and other parts of the outer skin of the wheat berry which do not cling firmly to the latter.				
Bran Duster	Brosse à Son	Die Kleienbuerste	Cepilladora de Salvado	Spazzola da Crusca
Machine for removing the flour particles as much as possible from the bran.				
To Break or Granulate	Broyer	Shroten, Brechen	Quebrar	Macinare
To reduce the wheat to a number of smaller pieces, but leaving the bran as intact as possible in order to remove the latter in dressing machines and purifiers.				
Granulation	Broyage	Der Schrot Process	Quebradura	Macinato
The breaking process.				
Stive Room	Chambre à Poussière	Die Staubkammer	Cuarto de Polvo	Camera da Polvere
Dust Chamber				
Settling chamber in which are collected the impurities carried away with the air from the fans of the wheat-cleaning machinery, or the stive and light fluff which is drawn off the purifiers, etc.				
Dust Collector	Collecteur de Poussière	Der Staubfaenger	Collector de Polvo	Collectore da Polvere
Automatic apparatus for collecting the dust, stive, etc., from purifiers and other aspirated machines, in order to avoid waste and to keep the mill clear from suspended flour dust which is injurious to the workmen, and liable to cause dangerous explosion.				
Horse-power	Cheval-vapeur	Pferdekraft	Caballo	Cavalli
Unit employed for valuing the force of prime movers.				
To Split or Bruise	Comprimer, écraser	Spalten, Quetschen	Comprimir	Comprimere
To split the wheat along the crease in order to facilitate the removal of the germ and chause.				
Belt	Courroie	Der Riemen	Correa	Cigna
To Grind	Moudre	Mahlen	Moler	Macinare
To reduce grain to flour; to reduce a substance to powder.				
Damper	Mouilleur	Netzcyylinder	Mojador	Bagnatrice
Apparatus for moistening the grain after cleaning and before grinding.				
Feed Hopper, Shoe	Tremie	Das Rumpfzeug, der Einlaufrichter	Tolva	Tramoggia
A wooden or sheet-iron receptacle, generally made in the shape of an inverted pyramid, used for distributing an even feed of wheat, meal, middlings, etc., into the respective milling machines.				

nati, about a week ago, go into one of the biggest establishments there, and I'm a sucker if he didn't raise the whole house with two jacks. Prettiest game of bluff I ever saw."

The other man gave Cincinnati the lead, and Chicago came in a very fair second.—*Merchant Traveler*.

FORGOT THE MAIN FEATURE.—The other day while Major Dodridge was sitting in his dooryard the gate opened and a strange looking man hastily approached.

"Is this Major Dodridge?"

"Yes, sir."

"Of the Eighth Arkansaw during the war?"

"Yes," beginning to look with interest at the stranger.

"Don't you remember me, major?"

"No, I can't place you."

"Take a look at me," shoving back his hat.

"Don't remember that I ever saw you before."

"I am Hank Parsons!" exclaimed the man, bracing himself as though he expected the major to rush into his arms.

"Don't recall the name," said the major.

"Is it possible? I did not think you would ever forget me. I'll refresh your memory. At Shiloh, while the battle was raging in murderous fury, I found you lying on the field shot through both legs. I took you on my back and carried you to a spring in the shade. Now don't you recollect me?"

"Let me see," mused the major. "I remember having been wounded; but I can't recall the fact, if it be a fact, of any one taking me to a spring."

"This is, indeed, strange," said the disappointed man. "I looked forward to meeting you with such anticipations of a warm greeting. Well, well! The world has indeed reached its ungrateful age. The occurrence is as fresh to my mind as though it had taken place yesterday. I gave you a drink of whisky and—"

"What!" exclaimed the major, springing to his feet. "Gave me a drink of whisky! Oh, yes, I remember now," seizing the man's hand. "O, I'll never forget that drink! The whisky was so new that corn meal was floating round in it, but we enjoyed it. Remember you! Why, I should cavort. Why didn't you guard against possible embarrassments by mentioning some of the main features of the occurrence?"—*Arkansaw Traveler*.

AN Austin colored man, with protruding eyes, rushed into Justice Tegner's office and exclaimed: "I wanted Cal Jones, who libs next door to me, put under a million dollars bond ter keep de peace." "Has he threatened your life?" "He has done dat berry ding. He said he war gwine ter fill the next niggah he found after dark in his hen house plum full of buckshot."

AT a recent suit in New York, in which the defendant was a bankrupt, the plaintiff's lawyer put the question: "How many times have you failed?"

"Dot ish mine own pisiniss," answered the son of Israel.

"Ah," retorted the lawyer, "how long have you been in that business?"

"OH, my child, how did your face become so bruised? Come to mamma and tell her all about it."

"I-I-I was over 'cross the r-o-a-d, playin' with Mis' Howe's little g-i-r-l; boo-hoo-oo-o."

"And did she hurt you like this?"

"Y-y-y-e-s-s."

"Well that was real naughty in her. What did she do to little Georgie?"

"Sh-sh-she knocked me d-o-w-n, an-an-and then she hit me w-w-i-w-i-th a b-r-i-c-k, and pounded me w-w-i-w-i-th a b-r-o-m-s-t-i-c-k."

"Oh, dear, what a terrible child. Well, don't cry any more, Georgie. What were you doing when this happened?"

"Pl-pl-playin' w-we w-a-s m-a-r-r-i-e-d."

LE coin du feu? What is woman? For a painter, a model; for a doctor, a subject; for a peasant, a housekeeper; for a Parisian, a dowry; for a naturalist, a female; for an Albanian, a beast of burden; for a Roman, a citizeness; for a schoolboy, an angel; for an honest man, a companion.

"COME here, Lucy," said an Austin father to his 11-year-old daughter, who was championing a gum-drop, and rocking her doll to sleep; "come hither, girl." [She came.] I've a notion to box your ears for talking to Tommy Jones over the gate. What do you mean by flirting with the boys?"

"Pa, we are not flirting. Bye O Baby. Now you go to sleep, dolly, like a good little girl. No, father, ours is no mere frivolous flirtation."

"I suppose," said the father, giggling at the absurdity of the idea, "you are engaged."

"No; we are not engaged; but, pa, you might aid us in carrying out the desire of our young hearts. It would make us so happy."

"Want to get married, do you?"

"Oh, no; we were married two months ago. A divorce is what we are after now."—*Texas Siftings*.

A RECONNOITERING EXPEDITION.—A young negro man looked in at the window of the Atlanta police station, and anxiously inquired: "Capt'n, is you ails got Bill Davis in de callyboose yit?"

"Yes; do you want to see him?"

"No, sah. I dess wanted ter kno' whud-der I cood go down ter his house ter-night."

"Well, you can ask him."

"I don't want ax 'im; I dess wanted ter kno' ef he wuz hyar, an' gwinter stay in!"

"What do you mean?"

"Well, boss; I see co'ting Bill's gal, an'—an'—yer see, I se de berry same nigger what he busted down er panel ob fence wid las' Chuesday night!"

He was assured that Bill was safe for the night.—*Georgia Cracker*.

A SCATHING DENUNCIATION.—John Randolph's denunciation of Henry Clay, in a secret session in 1825, was so scathing that the victim could not answer, but sought revenge through a challenge. Randolph, pointing his long finger at him, said: "This man (mankind, I crave your pardon), this worm (little animals, forgive the insult) was raised to a higher life than he was born to, for he was raised to the society of blackguards. Some fortune, kind to him, cruel to us, has tossed him to the Secretaryship of State. Contempt has the property of descending, but she stops far short of him. She would die before she would reach him—he dwells below her fall. I would hate him if I did not despise him. It is not what he is, but where he is that puts my heart in action. That alphabet that writes the name of Thersites, or blackguard of squalidity, refuses her letters for him. The mind which thinks on what it cannot express can scarcely think on him—a hyperbole for meanness would be an eclipse for Clay."—*B. P. Poore in Boston Budget*.

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ITEMS OF INTEREST.

TRAMWAYS AT RIO JANEIRO.—The Brazilian capital is particularly rich in tramways, there being no less than 138½ miles within the city and suburbs. The four largest of these tramways are the Botanic Gardens, 2¼ miles; the St. Christo, 27¼ miles; the Villa Isabel, 17 miles; and the Urbain, 28¼ miles. Altogether the 138½ miles of tramway existing in Rio de Janeiro and the neighborhood are owned by nine companies. The rolling stock placed by these companies upon the lines, comprises 554 carriages, of which 383 are used for the conveyance of passengers, and 191 for the carriage of goods. The traction service is carried on by mules and horses, and there are no less than 4,921 of these animals at work on the lines. The working staff comprises 1,482 persons. The number of passengers conveyed over the lines has averaged 35,532,926 per annum. The net profits realized upon the four principal lines last year were as follows: Botanic Gardens, £93,025; St. Christo, £62,165; Villa Isabel, £17,518; and Urbain, £43,666. Two of the smaller tramways were worked at a slight loss last year.—*Engineering*.

THE Mechanical World, after pointing out the necessity for a cheap disinfectant for workshops and places where many people are likely to congregate, gives on good authority, the following plan for preparing a cheap and effective disinfectant—something that will quickly neutralize offensive smells: "Take half a drachm of nitrate of lead dissolved in a pint or more of boiling water, and dissolve two drachms of common salt in a pail or bucket of water. Pour the two solutions together and allow the sediment to subside. The clear supernatant fluid will be a saturated solution of chloride of lead." This can be sprinkled around in places to be disinfected. It is said a cloth dipped in this solution

and hung up in a room will instantly sweeten the atmosphere. This is worth a trial in many industrial establishments, where the health of the operatives is endangered by evil odors.

DIRECTING PARTITIONS AND FLOATS OF TURBINE WHEELS.—The directing partitions and floats of turbines should be of sufficient number to give to the velocity of the water their own direction. The distance of any two consecutive floats or partitions apart should not be at any point more than 2.34 inches to 3.12 inches, measured along the normal to the surfaces, and generally it is made less. However it must not be made too small, for then the friction of the water against the solid sides would be too great.—*Bresse*.

SLATE for roofing originally costs, per square, \$4.50, and lasts at least 60 years; boards cost \$2.00, and last 8 years; shingles cost \$4.00, and last 12 years; corrugated iron \$6.00, and lasts 20 years; and tin costs \$6.50, and last 20 years. Making the average cost per annum as follows: Slate 7½ cents; boards, 25 cents; corrugated iron, 30 cents; tin 32½ cents; shingles 33½ cents. Making slate, without reference to other considerations than original cost and life, almost four times cheaper than boards, more than four times cheaper than corrugated iron and tin, and nearly five times cheaper than shingles.—*State Trade Journal*.

GERMAN FACTORY REPORTS.—The reports of the German factory inspectors for the year 1888 have just been published, and contain some figures of interest. At the time the report was made up, the general condition of the many industries was considered good. In Prussia some works, particularly sugar factories, showed an increase in number, and every kind of industry, except brick and glass, was flourishing. The industrial works of Berlin showed a marked increase in both

steam power used and the number of artisans employed. The increase in child labor employed equaled 11 per cent., but of this increase only 2 per cent. were children under 14 years of age, and the tendency, as shown by the reports, was to employ less of this labor every year. The complaints of immorality among the female operatives were diminished and more care was taken in the separation of the sexes. An increase in the number of accidents was noted in every part of Germany, and this was attended by a larger percentage of fatal injuries. The great good of having inspectors to which employers and employees could refer disputes, was illustrated by the numerous cases in which inspectors caused settlements to be made without appealing to the courts. The general condition of the working people was fair, and the only drawback to the report was the fact that the manufacturers made very little money during the year.

FIRE RISKS IN MACHINE-SHOPS.—Establishments for building steam engines and boilers are, in the construction-shops for the former, probably the best type of the machine shop that exists. Here the fire risk is purely a machine making risk; and while flame occurring would in a small degree destroy the substance of the machine, it would decrease its adaptability to its purpose. The danger from friction is considerable. Most of these works, however, have boiler shops attached that form the weak spot of the place, unless placed at considerable distance, when the boiler shop could and should bear its own burden of many forge fires and red-hot bolts flying about in all directions, held by tongs in the hands of boys. A foundry is, however, much more likely to be immediately adjoining a steam-engine shop than a boiler shop would be. It would, therefore, be correct to consider most of the establishments

as subject only to this foundry risk. It is rarely that a pure machine shop of any considerable size is entirely isolated from one or the other of the two adjuncts. The Chronicle fire tables give 2.30 per cent. per annum as the proportion of foundries and machine-shops taking fire in the United States during the nine years of observation, 1875-1883 inclusive.—*Engineering and Mining Journal*.

ACCORDING to experiments carefully made at Houghton Farm, N. Y., it seems that an exact bushel of corn is seldom sold. The standard bushel, 56 pounds, should be of dry grain, while the 56 pounds of harvest weighs when dry only 52 pounds, and when kept a few months sinks to 46 often, while corn varies in weight with the wet and dry condition of the weather. A yield of 100 bushels per acre by weight, say those who have studied the above experiment, weighed thirty days after husking, would show a great falling off in six months. About 65 pounds of new shelled corn, it is found, is required to make 50 pounds of dry corn.

EXPERIMENTS on an extensive scale have been made by the Dutch government to ascertain the strength of iron and steel girders. The soft steel girder proved to be 22 per cent. and the hard steel girders 66 per cent. stronger than the iron girders. It was pretty well established that the strength of steel girders is about the same for the two flanges if they are made alike in section.

A CONTRIBUTOR to a London scientific paper says that a very simple and effective way of coloring a meerschaum bowl is by painting it while you are smoking, and after it becomes warm, with the creamy surface of good milk (or with cream) by means of a common hair pencil, which brings out the brown and yellow colors beautifully, and as if by magic.



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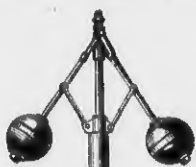
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Head Miller Kings Co. Mills, Brooklyn, N. Y.

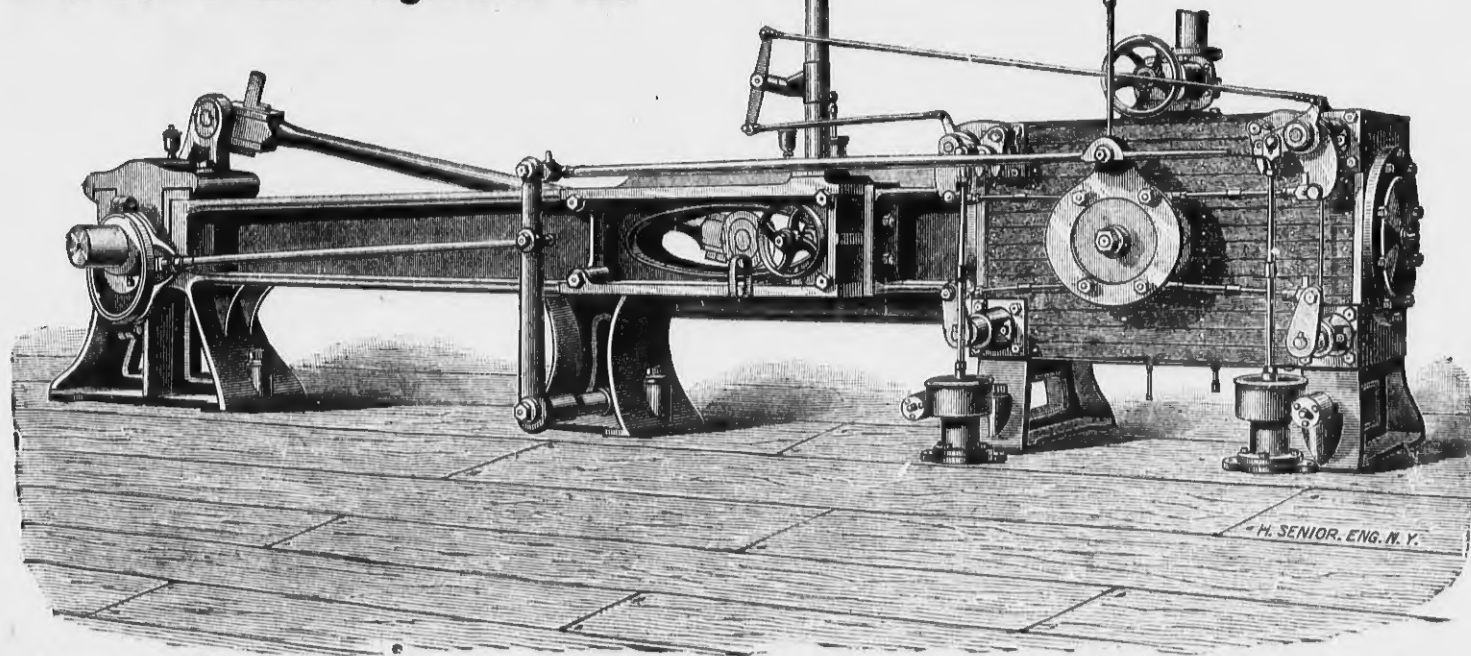
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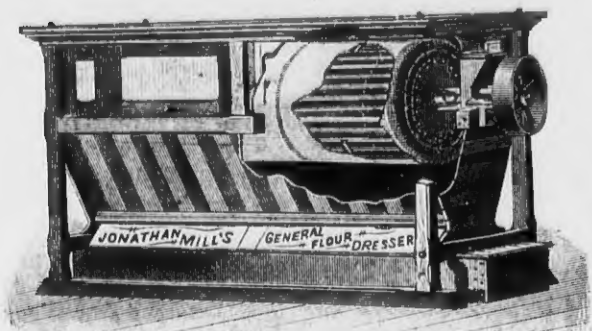
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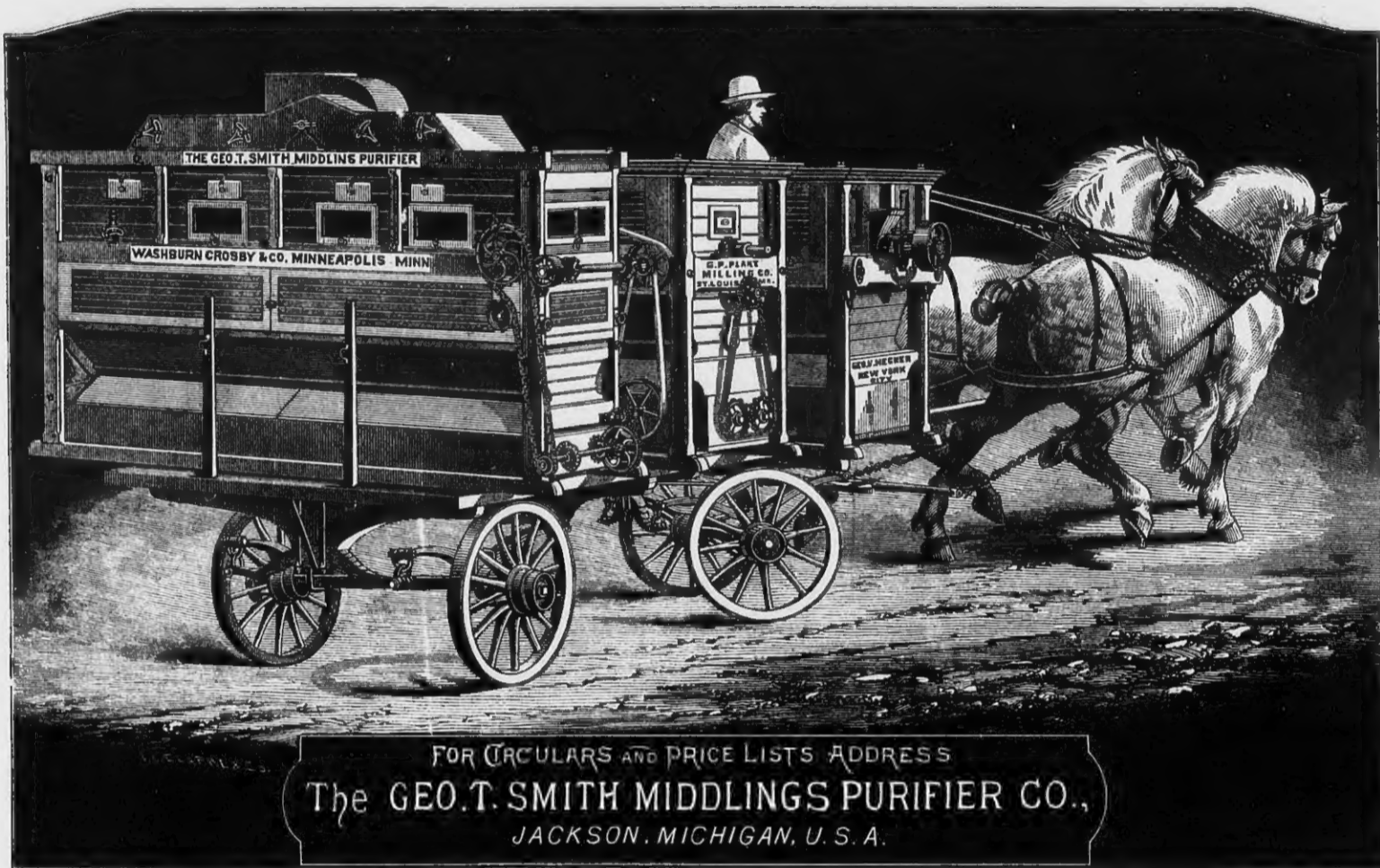
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 Yours, etc., R. H. FAUCETT, Prest.

500 BARREL MILL IN ILLINOIS.

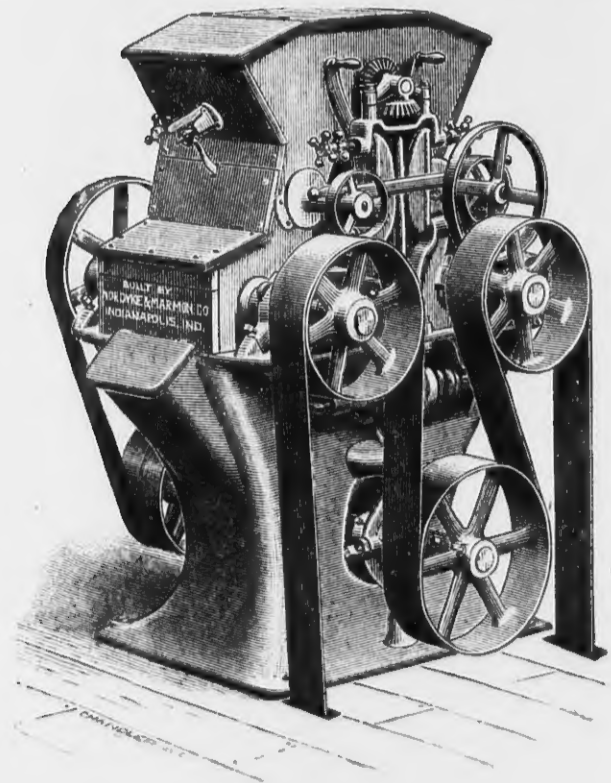
MESSRS. NORDYKE & MARMON CO., INDIANAPOLIS, IND.

Gents:—We started up our mill in June last year, and it gives us pleasure to say that your Roller Mills are doing splendid work and give us no trouble. Your milling program required no changes, and concerning yields, we get all the flour from the offals, and we sell our best grades in the principal markets of the United States at the highest prices offered for any flour. All the machinery made by you is first-class, and we would not know where to purchase as good.
 Yours respectfully, DAVID SUPPGER & CO.

125 BARREL MILL IN INDIANA.

NORDYKE & MARMON CO., INDIANAPOLIS, IND.

Gentlemen:—The 125 barrel Mill you built us has been running all summer, and does its work perfectly. Before contracting with you for this machinery we visited many Roller Mills throughout the West and Northwest, built by the different leading Mill-furnishers, and from all we could see, those built by you seemed to be giving the best satisfaction, and this is why we bought our machinery of you. Our mill comes fully up to your guarantees, and the capacity runs over your guarantee. The bran and offal is practically free from flour, and our patent and bakers' flour compares favorably with any we have seen elsewhere. I don't think anyone can beat us. Your Roller Machines are the best we have seen; they run cool, and the interior does not sweat, and cause doughing of the flour. Judging from our success, we would recommend other millers to place their orders with you.
 Yours truly, J. T. FORD.



Letters on file in our office from a large number of small Roller Millers giving as favorable reports as above. A portion will be published as occasion demands.

SPECIAL MILLING DEPARTMENT!

Mill Builders and Contractors—Guarantee Results.

Motive Power and Entire Equipment of a Modern Mill Furnished under one Contract.